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WATER-ORIENTED OUTDOOR RECREATION IN THE LAKE SUPERIOR BASIN

(MICHIGAN, MINNESOTA AND WISCONSIN)

BUREAU OF OUTDOOR RECREATION

PREPARED FOR
FEDERAL WATER QUALITY ADMINISTRATION

OCTOBER 1970

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LAKE SUPERIOR BASIN

Water-Oriented Outdoor Recreation

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The Lake Superior Basin is experiencing effects of water pollution and other environmental impairments. This report has identified specific areas where air and water pollution sources are interfering with recreational use and lessening the basin's environmental quality.

The fact that Lake Superior is the only remaining Lake of the Great Lakes still in a relatively unpolluted condition and that it is the major source of water for the lower Great Lakes, makes it very urgent that a prevention philosophy be adopted as quickly as possible. Close coordination among all levels of government and private enterprise, the use of sound planning, and, most importantly, the use of effective enforcement measures will all be necessary in eliminating existing environmental problem areas and protecting those areas of high environmental quality.

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MICHIGAN, MINNESOTA and WISCONSIN

October 1970

prepared for:
Federal Water Quality Administration
Great Lakes Region, Chicago, Illinois

by:
Bureau of Outdoor Recreation
Lake Central Region
Ann Arbor, Michigan

UNITED STATES DEPARTMENT OF THE INTERIOR

COVER PHOTO:

Chapel Rock, Pictured Rocks National Lakeshore. Photo by Michigan Department of Natural Resources.

TITLE PAGE PHOTO:

Shoreline on Keweenaw Peninsula near Eagle Harbor, Michigan. Photo by Michigan Department of Natural Resources.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
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D6427GL
Lake Superior

September 23, 1970

Mr. Francis T. Mayo, Regional Director
Federal Water Quality Administration
Great Lakes Region
33 East Congress Parkway
Chicago, Illinois 60605

Dear Mr. Mayo:

Enclosed is our report on the outdoor recreational aspects of the Lake Superior Basin. This report has been prepared under the basic authorization contained in Public Law 88-29, 88th Congress, enacted May 28, 1963, and in response to your request for our participation in the Great Lakes-Illinois River Basins Project.

The Lake Superior region is a relatively undeveloped area of great scenic beauty, containing a wealth of natural resources and endowed with an interesting historical background. Much of this "northland" is well suited to recreational use and fulfillment of the visitor's sense of esthetic appreciation. In the past, many have enjoyed tourism and recreation in the basin; however, it has been only recently--within the last five to ten years--that consideration has been given to a greater utilization of the region's resources for outdoor recreation. Pictured Rocks was established as the nation's first national lakeshore in October 1966, and the Sylvania Tract was opened to the public as a federal area in 1967. The Apostle Islands are being considered for designation as a national lakeshore. Important developments are also occurring at a number of state and municipal park, forest, and recreation areas. Indications are that in the future this region will become more important as a "north woods retreat" for increasing numbers of people.

Despite a rather sparse population and a modest amount of industry, the Lake Superior Basin, as evidenced by this and other reports, is experiencing effects of water pollution and other environmental impairments. This report has identified specific areas where air and water pollution sources are interfering with recreational use and lessening the basin's environmental quality. Due to recent public concern and the increasing effects of a deteriorating environment upon so many facets of our everyday life, attention to pollution control on the other Great Lakes has greatly accelerated and stronger efforts are being made to eliminate existing pollution sources and eventually to restore waters to a more desirable state. With the necessity for employing "cures" to return these Great Lakes water systems to an improved condition—all of which are highly expensive and which involve considerable periods of time before satisfactory results are realized--it seems vividly clear that now is the time to utilize a more effective method of dealing with Lake Superior--with emphasis on prevention. With the elimination of all sources of pollution before they have progressed to a point of irreparable or serious harm, little or no expensive "cure" will be necessary.

The fact that Lake Superior is the only remaining lake of the Great Lakes still in a relatively unpolluted condition and that it is the major source of water for the "lower" Great Lakes, makes it very urgent that a prevention philosophy be adopted as quickly as possible. Close coordination among all levels of government and private enterprise, the use of sound planning, and, most importantly, the use of effective enforcement measures will all be necessary in eliminating existing environmental problem areas and protecting those areas of high environmental quality.

Publication of "Lake Superior Water-Oriented Outdoor Recreation" marks the completion of this series of studies on the Great Lakes-Illinois River Basins. We have appreciated the opportunity to participate in this project and we trust that each of our reports will encourage further action toward achieving our common objective: water of the highest possible quality for outdoor recreation and all other needs.

Sincerely yours,

Roman H. Koenings

Roman H. Koenings
Regional Director

Enclosure

Foreword

"The great question of the '70s is shall we surrender to our surroundings or shall we make our peace with nature and begin to make reparations for the damage we have done to our air, our land, and our water?

"Restoring nature to its natural state is a cause beyond party and beyond factions. It has become a common cause of all the people of America. It is a cause of particular concern to young Americans—because they, more than we, will reap the grim consequences of our failure to act on programs which are needed now if we are to prevent disaster later.

"Clean air, clean water, open spaces—these should once again be the birthright of every American. If we act now they can be.

"We still think of air as free. But clean air is not free, and neither is clean water. The price tag on pollution is high. Through our years of past carelessness we incurred a debt to nature, and now that debt is being called."

President Richard M. Nixon
State of the Union Message
January 22, 1970
Washington, D. C.

Foreword

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the south and the short summer tourist season are the primary factors accounting for the light to moderate recreational use in many portions of the basin. However, several of the basin's larger state parks now receive moderate to large numbers of people during the summer vacation period. The current annual recreation demand is estimated at more than 16 million recreation days. By 1980 this demand is estimated to nearly double and it could increase nearly 3.5 times by the year 2000. In 1964 an estimated 1.4 million vacationists came to the Lake Superior Basin for the primary purpose of outdoor recreation. Approximately 80 percent of the present demand can be attributed to vacation use.

Public ownership in the basin comprises over 4 million acres of land and water of which only 5,700 acres are intensively developed for recreation use. Large acreages of public lands, however, are available to satisfy low density participation in camping, hiking, fishing, hunting, and nature study. Approximately 80 percent of the 218 recreation areas provide water-dependent facilities. An analysis of the demand-supply relationship in 1965 revealed a basin need for only 300 acres of additional developed land. It is estimated that an additional 22,000 acres of developed recreation land will be required in the year 2000. Future increased tourist use of the Lake Superior Basin will create a need for additional private and commercial lodging establishments as well as additional developed acreages of public lands to provide the necessary recreation facilities.

In addition to increasing population, rising per capita income, and greater leisure time are factors peculiar to the Lake Superior region, which either are existing or which might develop in the future to draw a greater number of vacationists and tourists to the area. Recent developments include: (1) the establishment of Pictured Rocks National Lakeshore, (2) the introduction of coho and chinook salmon into Lake Superior waters, (3) the rehabilitation of the lake trout, and (4) a large reduction in the Mackinac Bridge toll rates. It appears that in the near future the North Country Trail will be established and constructed. The Apostle Islands are being considered for establishment as a national lakeshore. The development of other major federal or state recreation areas could also occur in the future. Despite the above mentioned developments, future trends in tourism will be highly contingent upon the extent of facility development undertaken by public resource managing agencies--in general, greater facility development will draw a greater number of tourists while an emphasis on less facility development will tend to limit the number of people who will visit the region.

The presence of a wide variety of interesting and scenic natural features in the Lake Superior Basin has made sightseeing the most popular attraction for visiting tourists. Legacies of past pioneer history and Indian lore are available to be re-created and interpreted for basin visitors. The inception of additional interpretive programs and the establishment of other historical sites have significant merit in better portraying the basin's past and present natural and cultural legacies. Access to public lands and water areas is an important consideration in obtaining a more complete utilization of the Lake Superior Basin's resources by the outdoor recreation public. The establishment of new state and federal outdoor recreation areas may require improvement of existing basin highways. Recent developments, as described in this report, may require the construction of new and/or improvement of existing harbors of refuge. The rough and unpredictable nature of Lake Superior's waters and the wild and sensitive nature of its shoreline ecology are two factors which should be carefully considered if and when any construction and/or improvement of harbor facilities is undertaken. It should be recognized that some desirable natural features (inland lakes, streams, and unusual timber stands) are better left in a relatively untouched condition. Therefore, certain of such features should be provided with only limited access. The use of social controls such as eminent domain, zoning, and tax assessment policies will be vital in protecting and enhancing the Lake Superior Basin's natural qualities. Recreational use of the basin, including tourism, is expected to increase, creating a need for closer coordination among responsible planning groups, managing agencies, and the private sector. Such coordination is needed to reduce environmental deterioration to a minimum and to retain the wild and rustic character of the Lake Superior Basin.

In addition to those places already established as federal or state outdoor recreation areas are other locations in the basin that possess outstanding scenic qualities, historical significance, and recreation potential which should receive further consideration for establishment as federal, state, or local outdoor recreation areas or parks.

In general, the Lake Superior Basin possesses waters of excellent quality. To be properly and fairly evaluated, however, the pollution problems of the Lake Superior

Basin should be examined in their own light. Several pollution problems do exist, foremost of which are: (1) the pollution of the St. Louis River below Cloquet, Minnesota, and the Duluth, Minnesota-Superior, Wisconsin area; (2) the discharge of taconite tailings into Lake Superior along the basin's North Shore area; and (3) the presence of pollutants in Chequamegon Bay in the vicinity of Ashland, Wisconsin. During the summers of 1961 through 1964, the presence of concentrated coliform organisms created a health hazard, forcing the closing of a beach at a municipal park in Superior, Wisconsin. Consequently, an estimated 20,000 swimming occasions were lost to swimmers over a period of four years. In addition to these locations, this report has identified other specific areas in the Lake Superior Basin at which recreational use is either being impaired or is suspected of being affected. In some areas the esthetic quality of the landscape is being impaired by various sources of pollution. Nearly every municipality has inadequate treatment facilities and is adding in some measure to the pollution problem. Industries at certain locations are polluting waters of the basin to varying degrees.

Without proper controls and necessary safeguards, thermal pollution and radioactive contamination each represent possible threats to outdoor recreation values and the environmental quality of the Great Lakes Basins. Adequate controls are needed to limit any possible effects that thermal discharges from fossil-fueled power plants might have on the Lake Superior Basin's shoreline ecology.

Available to provide the basis for more complete control of water pollution are federal and state water pollution control laws, pollution bonding programs, existing interstate and intrastate water quality standards, and the recommendations presented by the Federal Water Quality Administration at the 1969 and 1970 Lake Superior Water Pollution Enforcement Conferences. These existing programs provide (1) urgently needed monies; (2) proper guidelines essential to the modification and construction of needed treatment facilities; and (3) the legal authority to insure proper enforcement measures, all of which are necessary in attaining the abatement of water pollution in the Lake Superior Basin. Federal laws include the Federal Water Quality Act of 1965 which, among other things, provides for the establishment of interstate water quality standards. The Clean Water Restoration Act of 1966 provides for federal grants to state and local governments to be used in water pollution control. Applicable state laws include the Michigan Water Resources Commission Act of 1965, as amended in 1966, and the Minnesota Crystal Waters Act of 1969. Pollution bonding programs passed in both Wisconsin and Michigan should be highly instrumental in providing needed funds for pollution control facilities. Other important acts which should aid in maintaining high water quality and controlling the unlimited use of basin lake and stream shorelines are the Wisconsin and Minnesota Shoreland Management Programs, and the Michigan Subdivision Control Act of 1967.

Despite the future importance and value of established interstate and intrastate water quality standards, it should be considered national policy that, if future upgrading of water quality standards is in the public interest and technically feasible, such an upgrading will be accomplished. Furthermore, it should be established policy that degradation of existing waters now exceeding established water quality standards will not be allowed to occur. As a minimum, the recommendations of the Federal Water Quality Administration at the 1969 and 1970 Lake Superior Enforcement Conference should be accomplished as a minimum within the established time limits if at all possible. Proper application of existing federal, state, and local water pollution control laws, bonding programs, water quality standards, and recommendations of the 1969 Lake Superior Water Pollution Enforcement Conference, combined with public interest and local support, can protect and enhance the basin's recreation resources and esthetic values.

Early detection of pollution problem areas and immediate attention to elimination of these existing problems is highly essential in the Lake Superior Basin. Such preventive action now can eliminate the necessity for later, expensive restoration attempts as are being required for both Lake Erie and Lake Michigan.

The Lake Superior region is an area of considerable natural wealth and has great potential for additional recreational use. Its recreation potential can be best realized through the wise utilization of basin resources, i.e., providing only a minimum amount of intensive development necessary at or near areas of outstanding resources. Emphasis should be placed on providing low density recreation development throughout other portions of the basin and controlling commercialization throughout the entire basin. Correction of existing pollution problem areas and continued surveillance of basin waters will insure the presence of high quality waters so essential to maintaining the environmental quality of the Lake Superior Basin.

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LAKE SUPERIOR
Le lac supérieur the French
called it meaning only that
geographically it lay above
Lake Huron. In size however
Lake Superior stands above
all other freshwater lakes
in the world. The intrepid
Frenchman Brule discovered
it around 1622. During the
1650's and 1660's French fur
traders such as Radisson
and Groseilliers and Jesuits
Fathers Allouez and
this great
Within 250 years
had

Chapter 1

Introduction

AUTHORIZATION

"Water-Oriented Outdoor Recreation in the Lake Superior Basin" was prepared by the Lake Central Region, Bureau of Outdoor Recreation, Department of the Interior, at the request of Mr. William Q. Kehr, Project Director, Great Lakes-Illinois River Basins Project, Great Lakes Region, Federal Water Quality Administration,* Department of the Interior, by letter of July 15, 1963. The Bureau of Outdoor Recreation made the study under basic authorization contained in Public Law 88-29, 88th Congress, enacted May 28, 1963.

PURPOSE

This report serves as an appendix to the Lake Superior portion of the Great Lakes-Illinois River Basins Comprehensive Study conducted by the Federal Water Quality Administration. The Bureau of Outdoor Recreation's contribution to this comprehensive project is to plan and to coordinate in the development and use of the United States portion of the basin's natural resources in such a fashion that the quantity and quality of outdoor recreation can be optimized. More specifically, the purposes of this study are to: (1) inventory existing recreation resources of the basin, (2) identify proposed and potential recreation areas, (3) determine use pressures on existing facilities and the demand for additional developments, (4) discuss water quality influences on present and future outdoor recreation use, (5) establish objectives for meeting outdoor recreation needs within the basin, and (6) recommend action and/or programs to increase present and future resource capabilities for satisfying recreation requirements. The accomplishment of these objectives will emphasize deficien-

*Formerly the Division of Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare, subsequently transferred to the Department of Interior and renamed the Federal Water Pollution Control Administration.

cies in available recreation opportunities and will provide a framework for the development and improvement of the basin's recreation resources.

SCOPE

This report considers water-oriented outdoor recreation within the United States portion of the Lake Superior Basin. In addition, the study gives consideration to certain winter outdoor recreation activities. For reporting purposes, the following river basins were grouped into three zones:

Zone 1	Zone 2	Zone 3
Waiska	Huron	Bois Brule
Tahquamenon	Ontonagon	St. Louis
Two Hearted	Montreal	Baptism
Au Train	Bad	Temperance
Yellow Dog	Iron	Pigeon

A reference map delineating the study area is on Plate 2-1.

In discussing some of the various recreational aspects of the Lake Superior Basin the separate State Outdoor Recreation Plans were consulted for existing plans and policies. It does not appear that the basic views, policies, and philosophies expressed in this report substantially differ from those put forth in the outdoor recreation plans of the three basin states. It is hoped that much of the information put forth in this and other previous Great Lakes-Illinois River Basin Project studies will serve as an input for the current Great Lakes Basin Commission Comprehensive Study of the Great Lakes.

The inventory of recreation facilities is based on information contained in the Michigan, Minnesota, and Wisconsin State Comprehensive Outdoor recreation plans and on data compiled for the Nationwide Plan being prepared by the Bureau of Outdoor Recreation. Emphasis has been placed on public beaches, campgrounds, ski resorts, trails, interpretive areas, and other popular recreation facilities. The Bureau of Sport Fisheries and Wildlife is preparing a report specifically concerned with water quality and its effects on fish and wildlife in the Lake Superior Basin. However, the activities of fishing and hunting are given consideration. No attempt is made to evaluate children's playgrounds, amusement parks, and city parks that do not provide facilities for water-oriented recreation.

Projected use is estimated by considering existing, proposed, and potential area developments and their capacity to satisfy projected demand. Certain areas where low water quality has had significant impact in limiting outdoor recreation use are discussed. After the recreation resource needs of the basin have been determined, objectives are formulated and action mechanisms to implement the objectives are suggested. The views of cooperating agencies have been considered in recommending programs or actions to be taken to improve the basin's water recreation opportunities.

BACKGROUND

In late 1960, after authorization by the Federal Water Pollution Control Act, Section 2(a), Public Law 88-660, the Great Lakes-Illinois River Basins Project was initiated by the Public Health Service. There are three points in the Act pertinent to this study: (1) a comprehensive water control program should be developed; (2) it is recognized that the primary responsibility for water pollution control rests with the states and directs that the comprehensive studies be carried out in cooperation with the states and other agencies, both federal and local; and (3) in the development of such comprehensive programs due regard shall be given to the improvements necessary to conserve such waters for all uses, including recreation.

Early in 1962, the National Park Service was invited to participate as a cooperting agency in the comprehensive study. They initiated the study on the Illinois River Basin. During the latter part of 1962, their responsibility for the outdoor recreation aspects of the project was transferred to the newly formed Bureau of Outdoor Recreation. The Illinois River Basin study was then completed by the Bureau's Northeast Regional Office located in Philadelphia, Pennsylvania. Due to regional boundary adjustments, responsibility for the remaining portion of the outdoor recreation aspects of the GLIRB project was transferred to the Lake Central Regional Office, Ann Arbor, Michigan. Subsequent studies were completed for the Lake Michigan Basin in October 1965, the Lake Erie Basin in August 1966, the Lake Ontario Basin in October 1967, and the Lake Huron Basin in August 1969.

DEFINITIONS

In this report the following definitions are applied to outdoor recreation terminology:

ACTIVITY OCCASION - The participation by one person in one outdoor recreational activity during all or any part of one day. Thus, one person participating in several activities during a day could account for several activity occasions.

COLIFORM COUNTS - An estimate of the most probable number (MPN) of coliform organisms per 100 milliliters used as an indication of bacteriological contamination.

DAY-USE ZONE - That area where people seek recreational opportunities on a day-to-day basis. For this study it includes the area within a 40-mile radius of the central city of an SMSA.

EFFECTIVE POPULATION - The portion of the total population within the zone of influence which would seek recreation opportunity in the basin.

IMPROVED WATER QUALITY - Water which has been recovered through pollution prevention and abatement measures to the point where its chemical and physical characteristics and esthetic appearance are pleasing to the senses of sight, smell, taste, and feel. Hopefully, such waters will have been improved biologically to a condition that permits them to meet criteria for whole body contact water recreational activities.

LATENT DEMAND - That recreation demand which is inherent in the population but not reflected in the use of existing facilities; additional participation which could be expected to occur if adequate facilities are made available.

LOW WATER DATUM (LWD) - A plane of reference to which design dredge depths and the depths recorded in charts and navigational aids are usually related. The actual levels of the lake surface may be higher or lower than the LWD plane. The elevations on international Great Lakes Datum (1955) show Lake Superior to have a low water level of 600.0 feet.

MARKET AREA DEMAND - The demand that generally originates from within the 40-mile zone (day use) and 125-mile zone (weekend use). It is that demand for day or weekend use only.

OUTDOOR RECREATION - Leisure time activities which utilize outdoor recreation resources and facilities (90). *

OUTDOOR RECREATION RESOURCES - Land and water resources capable of providing outdoor recreation opportunity (90).

PARTICIPATION RATE - The number of occasions within a given time during which individuals participate in the various outdoor recreational activities as set forth in the Outdoor Recreation Resources Review Commission (ORRRC) Study Report No. 19.

RECREATION DAY - A visit by one individual to a recreation development or area for recreation purposes during a reasonable portion or all of a 24-hour period. It is assumed that the average person participates in 2.5 activities during an average visit to a recreational area. Therefore, 2.5 activity occasions equal one recreation day.

RECREATION DEMAND - The expression of people's interest in outdoor recreation opportunities stated in terms of activity occasions or recreation days.

RECREATION FACILITIES - Developed structures or conveniences for specific outdoor recreation activities in a designated area (90).

RECREATION MARKET AREA - That portion of the zone of basin influence from which 80 percent or more of the people who participate in outdoor recreation are drawn on one-day outings and/or weekend (overnight) trips(95).

RECREATION NEEDS - The difference between demand and supply expressed in terms of resource requirements or recreation days.

RESOURCE REQUIREMENTS - Acres of land and water required to satisfy the recreation needs of the population utilizing the study area.

RECREATION RESOURCE AREAS - Those geographic areas having favorable physical features and land use patterns to accommodate extensive recreation development and use (90).

*Number in parenthesis refers to Bibliography in Appendix D.

RECREATION SUPPLY - The resources and facilities capable of providing outdoor recreation opportunities.

RESIDENT POPULATION - That population residing within a prescribed geographic area.

STANDARD METROPOLITAN STATISTICAL AREA (SMSA) - A county or group of contiguous counties which contain at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county, or counties, containing such a city, or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city (83). For a more detailed description, refer to the definition reported in U.S. Bureau of the Census publications.

VACATION DEMAND - The demand that generally originates from outside of the 125-mile or weekend-use zone. It is that demand originating from persons staying for periods of three or more days.

VACATION FARM - A private farm where people may spend a vacation in a rural setting. Income derived from vacationers is supplementary to farm earnings.

VACATION-USE ZONE - Areas beyond the weekend-use zone (125 miles).

WATER-DEPENDENT ACTIVITY - A recreational activity which could not be carried out without the use of a body of water, water being the essential element to conduct the activity.

WATER-ENHANCED ACTIVITY - A recreational activity which is enhanced by the presence of a body of water but which can be carried out in the absence of water.

WATER-ORIENTED ACTIVITY - An all-inclusive term embracing water-dependent, water-enhanced, and any other outdoor recreation activities in which water augments the recreation experience.

WATER POLLUTION - The addition of any material or any change in quality or character of a body of water which interferes with, lessens, or destroys a desired use.

WEEKEND-USE ZONE - That portion of the zone of influence from which recreationists are drawn for weekend outings - between 40 and 125 miles of population centers.

ZONE OF INFLUENCE - That area from which all recreation seekers come to utilize a particular basin's resources. It would include those areas from which vacationers come as well as day and/or weekend users.

ACKNOWLEDGEMENTS

The Lake Central Regional Office has worked closely with state, local, and other federal agencies in the preparation of this report. The compilation of information, statistical data, etc., would not have been possible without the full cooperation of governmental agencies, universities, quasi-public organizations, and private groups. Special thanks are extended to all those who loaned photographs whether or not they appeared in the final report. Although many people with agencies and organizations named below gave willingly of their time to answer questions and to provide information required for this report, they are too numerous to acknowledge individually, but their efforts are gratefully appreciated.

FEDERAL

- U.S. Department of Agriculture
  - Forest Service
  - Soil Conservation Service

- U.S. Department of the Army
  - Corps of Engineers

- U.S. Department of Commerce
  - Weather Bureau

- U.S. Department of the Interior
  - Bureau of Commercial Fisheries
  - Bureau of Indian Affairs
  - Bureau of Sport Fisheries and Wildlife
  - Federal Water Quality Administration
  - National Park Service

STATE

- Michigan Department of Natural Resources
  - Water Resources Commission
  - Recreation Resource Planning Division
  - Michigan Tourist Council
  - Division of Parks

- Michigan Department of Commerce
  - Office of Economic Expansion

- Wisconsin Department of Natural Resources
  - Division of Conservation
    - Bureau of Parks and Recreation
  - Division of Environmental Protection
    - Bureau of Water Resources

- Minnesota Department of Conservation
  - Bureau of Planning
  - Division of Game and Fish
  - Division of Parks and Recreation

- The Minnesota Pollution Control Agency

- Minnesota Department of Economic Development

LOCAL

City of Superior, Wisconsin
Mayor's Office
Department of Health

City of Ashland, Wisconsin
Mayor's Office

City of Duluth, Minnesota
Department of Research and Planning

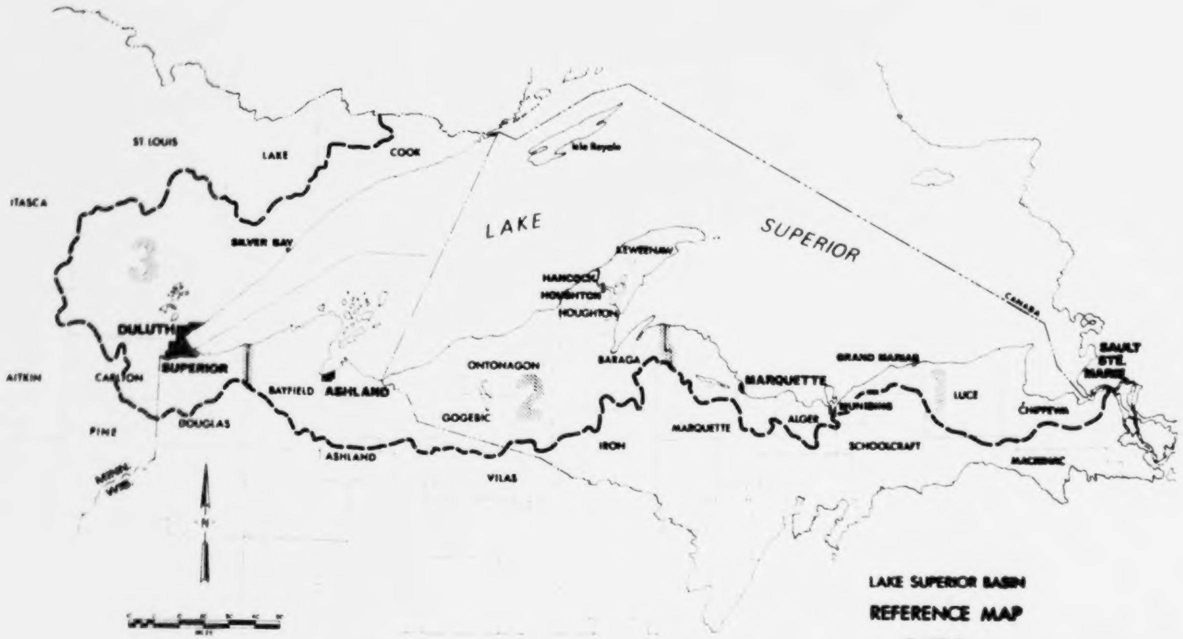
PRIVATE

Duluth Herald
Minneapolis Tribune

General Description
Chapter 2

PHYSICAL

Location. The United States portion of the Lake Superior Basin lies within the northern portions of the States of Michigan and Wisconsin and the northeastern portion of Minnesota, and comprises 20,600 square miles of water surface and 16,900 square miles of drainage basin land (74). The basin is a long narrow watershed extending 350 miles from east to west and 150 miles from its northernmost reach to its southernmost boundary. The watershed boundary extends inland as much as 100 miles and as little as 20 miles from the shoreline.



LAKE SUPERIOR BASIN
REFERENCE MAP
PLATE 2-1

Comprehensive river basin studies usually cover large expanses of land and water resources. The demand for and supply of recreation resources in one portion of the basin can vary considerably from another. Zonal breakdowns can provide a useful means of comparing area relationships of recreation demand, supply, and needs. Characteristics of topography and existing natural resources were considered in determining zonal boundaries in the Lake Superior Basin.

For reporting purposes, the basin has been divided into three geographical zones which are portrayed on Plate 2-1. A description of the location and extent of these zones follows:

Zone 1 encompasses the northern portion of Michigan's Upper Peninsula from Sault Ste. Marie to the Huron River west of Marquette, Michigan. The Waiska, Tahquamenon, Two Hearted, Au Train, Dead, and Yellow Dog Basins are included within the zone's boundaries. It is the smallest of the three zones and covers an area of about 3,000 square miles.

Zone 2 includes that area from the western edge of the Huron Mountains in Michigan's Upper Peninsula to the Bois Brule River Basin in Wisconsin. The Huron, Sturgeon, Ontonagon, Presque Isle, Black, Montreal, Bad, White, and Iron River Basins contained within this zone cover an area of about 7,300 square miles.

Zone 3 includes that portion of northern Wisconsin from the Brule River Basin to Grand Portage, Minnesota, including Isle Royale National Park in Lake Superior. Numerous river basins empty into Lake Superior along Zone 3. Some of the rivers included are the St. Louis, Cloquet, Nemadji, Bois Brule, Pigeon, and Temperance River Basins. The zone's total area is approximately 6,600 square miles.

Climate. Because of the mid-continent, mid-latitude position it occupies, the Great Lakes area is subject to great extremes of weather conditions. Lake Superior is so large that there are appreciable differences in climate between the north and south shore and also between the western and eastern ends. The lake, because of its effective heat storage capacity, has a considerable warming effect on air masses as they move across the open water in winter--as much as 15 to 20 degrees Fahrenheit (50). Table 2-1 lists the basin's average maximum and average minimum temperatures for summer and winter months.

Table 2-1

AVERAGE MAXIMUM AND AVERAGE MINIMUM TEMPERATURES FOR SELECTED MONTHS LAKE SUPERIOR BASIN

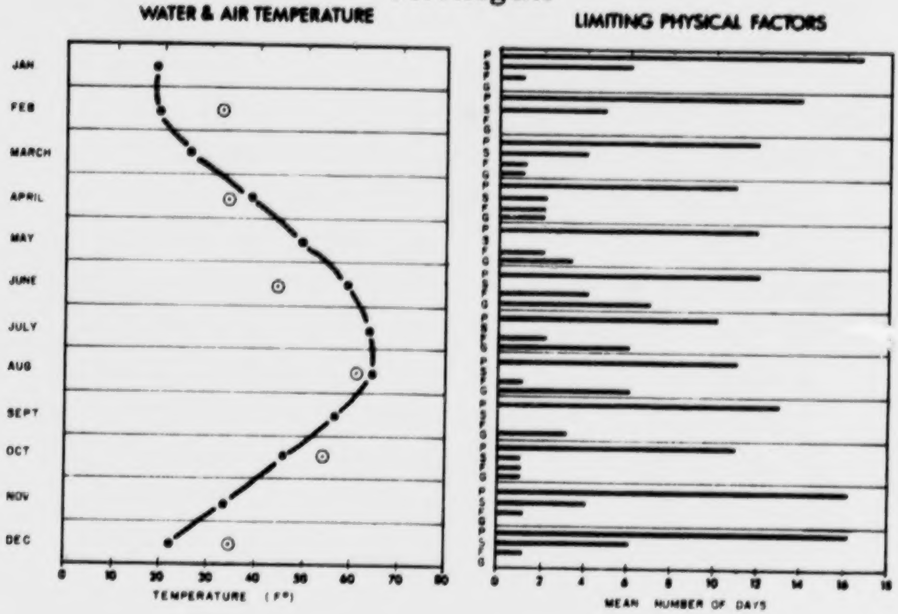
Months	Maximum	Minimum
June	74	54
July	80	58
August	75	54
December	25	2
January	20	2
February	22	5

Source: (114)

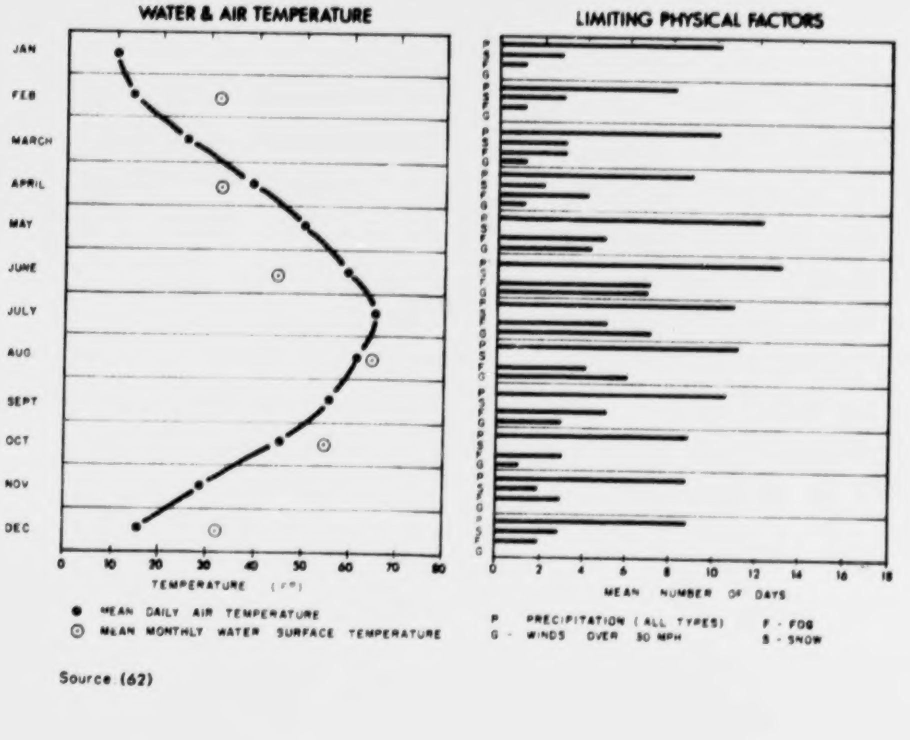
Most of the region has 28 to 30 inches of precipitation per year. Temperatures tend to be warm during the summer daylight hours, whereas summer nights are quite cool, with temperatures in the fifties not uncommon. Winters tend to be severe. Temperatures of 30 degrees below zero are not uncommon in portions of the basin (50). Large accumulations of snow along with the cold winter temperatures make the basin a popular winter sports area (See Plates 2-3 and 2-4). Lake Superior has more fog, larger waves, a rockier shoreline, and more shore ice than the lower Great Lakes. These climatic and physical factors in conjunction with the lake's remoteness and scarcity of harbors of refuge tend to discourage recreational boating. According to the Lake Superior Shoreline Recreation Graph appearing in ORRRC Study Report No. 4, on an average there are 30 days when wind velocities exceed 30 miles per hour during the boating season of May through September (See Plate 2-2). For the five-month boating season of 1968, small craft warnings were issued for all or portions of 24 days during each month (87). During this same five-month period, fog occurs approximately 10 days in the Michigan portion and 28 days in the Wisconsin and Minnesota portions of the basin (See Plate 2-2). Ice usually begins to form on many portions of Lake Superior by mid-December and remains until mid-March through late April, depending on location. The Lake Superior Basin has a smaller mean percentage of possible monthly sunshine for the vacation months of June and August than do the other Great Lakes Basins. During the month of June, Lake Superior averages 60 percent of sunshine as compared to 70 percent for the other Great Lakes. These same values also hold true during the month of Au-

PLATE 2-2
LAKE SUPERIOR SHORELINE RECREATION CLIMATE

Michigan

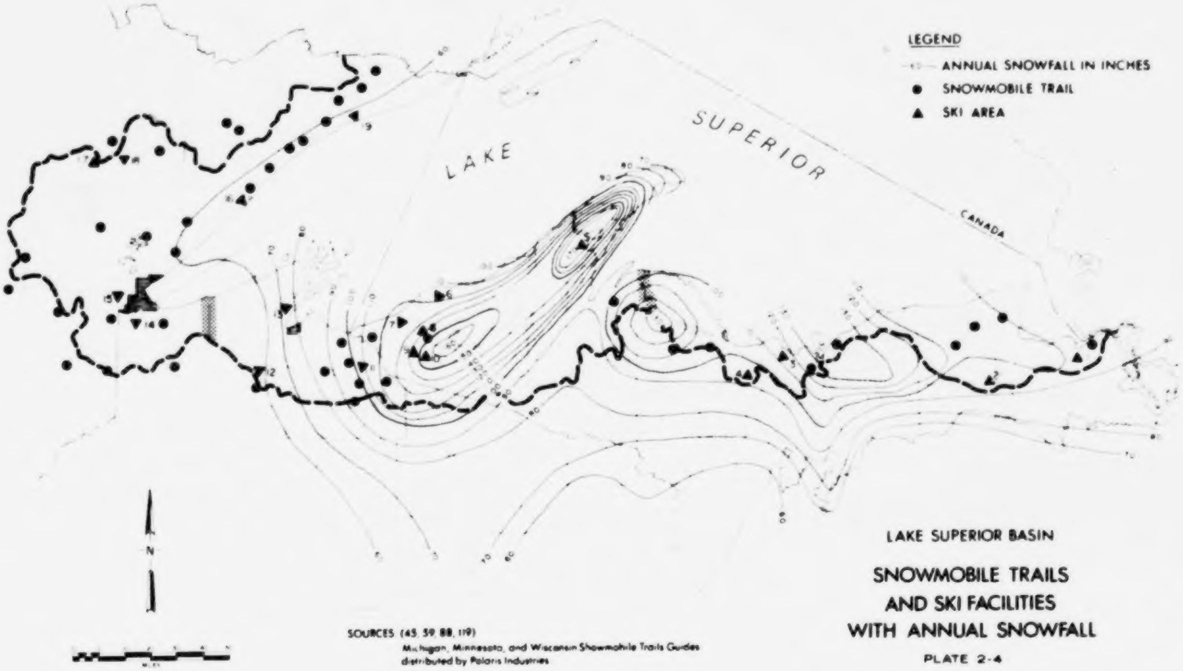


Minnesota - Wisconsin



Source (62)

Plate 2-3. Portions of Michigan's Keweenaw Peninsula receive up to 170 inches of snowfall annually--the highest annual snowfall east of the Mississippi River. (Photo by Michigan Department of Natural Resources.)



LAKE SUPERIOR BASIN

SNOWMOBILE TRAILS
AND SKI FACILITIES
WITH ANNUAL SNOWFALL

PLATE 2-4

SOURCES (45, 59, 88, 119)
Michigan, Minnesota, and Wisconsin Snowmobile Trails Guides distributed by Polaris Industries

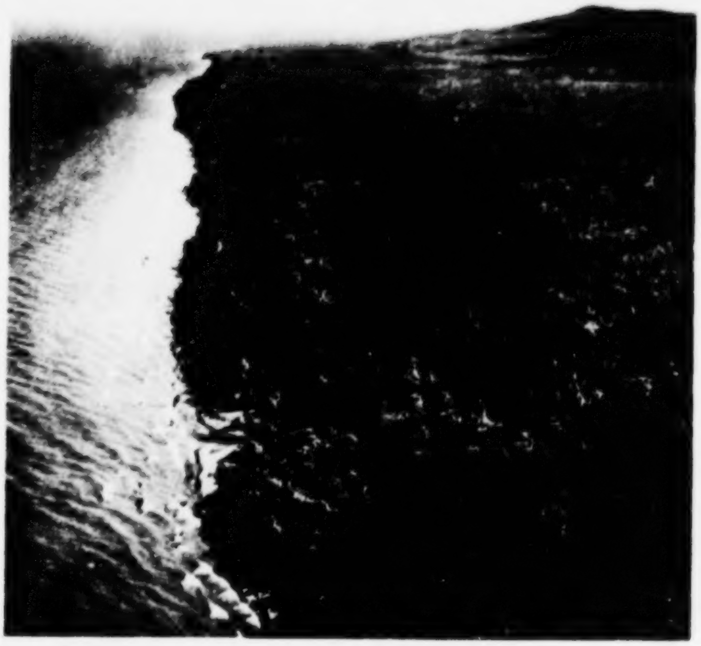
gust. Percentage of sunshine during July tends to be about the same for all of the Great Lakes Basins (88). Snowfall averages more than 100 inches annually throughout most of the basin. Portions of Michigan's Keweenaw Peninsula, Ontonagon and Gogebic Counties, and Alger and Luce Counties receive 120 to 170 inches per year (See Plate 2-4). Cool air and generally cold water temperatures tend to greatly restrict water contact sports. However, the pleasant, non-humid atmosphere in conjunction with the abundance of water and picturesque scenery attracts many campers, sightseers, fishermen, hikers, and others seeking relief from the warm, humid climate to the south.

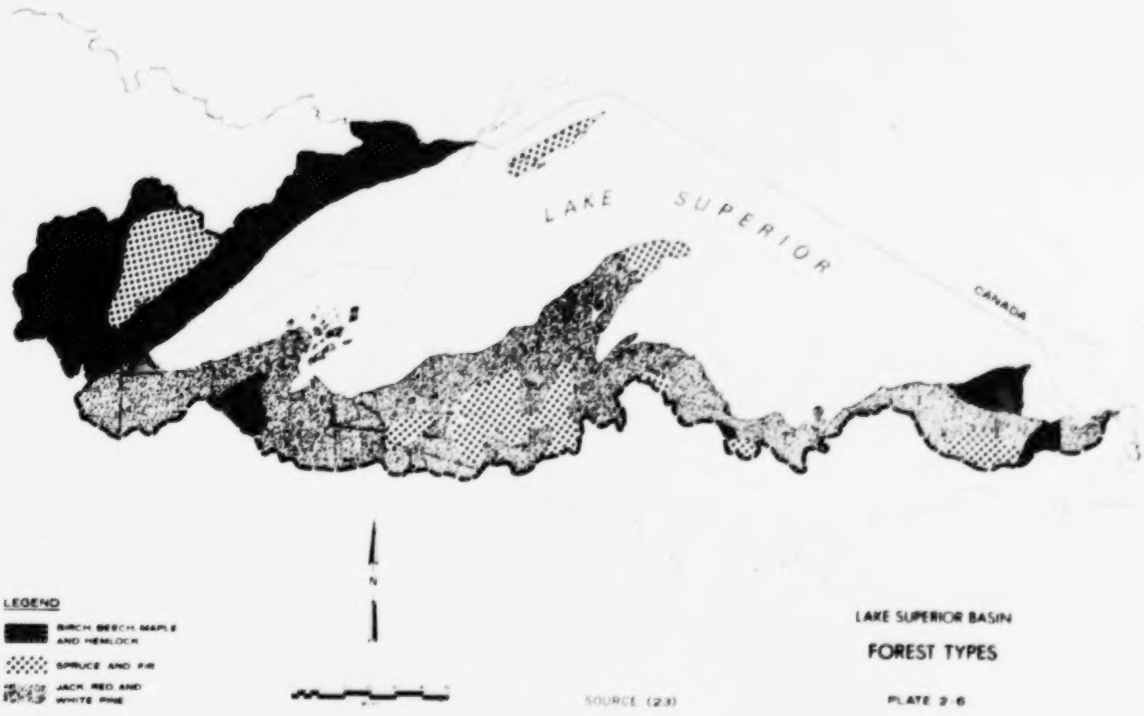
The Land.

Geology - Geologically speaking, the Lake Superior Basin is part of the large mass of Pre-Cambrian rocks known as the Canadian Shield. These rocks, reputed to be among the oldest in geologic history, are generally igneous and of volcanic origin. The physical characteristics of these rocks in conjunction with the advance and retreat of glaciers during the Pleistocene period largely determined the present topography of the Lake Superior Basin. With the exception of Michigan's Huron and Porcupine Mountains and the ridges of the Keweenaw Peninsula, the basin has low rounded hills or level to undulating plains. Its agricultural conditions are generally poor. All of the soils were formed under coniferous or mixed coniferous and hardwood forests. Such soils tend to be leached, acid, and deficient in the humus and minerals essential to plant growth. The Lake Superior shoreline consists mostly of rugged bluffs or cliffs, but it has some extensive beach areas in Michigan and Wisconsin.

Flora and Fauna - The Lake Superior Basin is heavily forested, with nearly 88 percent of the basin area classified as forest land. Originally, this region was covered with a superior stand of pines and other coniferous trees, and included many maple, beech, and other hardwoods. These stands were cut and logged between 1870 and 1930. Today, only a limited amount of first growth timber remains. The careless and wasteful logging practices allowed the cutover areas to burn. Consequently, the second growth timber was largely destroyed. Brush and trees with little commercial value tended to replace it. Subsequent reforestation programs have restored some of the areas with trees of commercial value. The goal of these programs is to grow both sawtimber and other wood resources which are used for pulp and other wood products (50). Pine,

Plate 2-5. A stretch of shoreline near Michigan's Porcupine Mountains. Nearly 90 percent of the Lake Superior Basin is classified as forest land. (Photo by Michigan Department of Natural Resources.)





SOURCE (23)

LAKE SUPERIOR BASIN

FORBEST TYPES

PLATE 2-6

spruce, fir, maple, beech, birch, and aspen are trees common to this region. Plate 2-5 portrays the three general classifications of forest types of the Lake Superior Basin.

In addition to providing valuable hunting and fishing opportunities, the many species of fish and wildlife of the Lake Superior Basin have a considerable esthetic appeal to most who recreate in the basin. Many species of songbirds, furbearers, upland game birds, waterfowl, and several big game species are found in the basin. Nature study and nature photography are popular activities of basin residents and visitors. The basin's inland lakes, streams, and rivers support a wide range of fish species. A more intensive treatment of the basin's fish and wildlife composition can be found in the Bureau of Sport Fisheries and Wildlife report concerning water quality and its effects on fish and wildlife in the Lake Superior Basin (108).

Plate 2-7. The moose is fairly common in the North Shore Zone of the Lake Superior Basin. Isle Royale National Park supports a herd of 600-800 of these animals. (Photo by Minnesota Department of Conservation.)

The Water.

Lake Superior - Lake Superior is the largest of the Great Lakes with a water surface of 31,700 square miles. Its surface is 600 feet above mean sea level. Maximum recorded depth is 1,333 feet; the average depth is 489 feet (74).

Seasonal fluctuations in Lake Superior water levels averaged 1.05 feet annually during the ten year period 1957-66. The low water period occurs in the spring months, February through April, while the high water period occurs during August through October. Long-term fluctuations resulting in high or low water cycles are caused by variations in precipitation and evaporation over extended periods of time. Winds, changes in barometric pressures, and lunar tides are responsible for short-term fluctuations. Generally, seiches do not prevail on Lake Superior to the extent or amplitude found in relatively shallow Lake Erie. Seiches are the inertial oscillations of the water surface that follow water level changes induced by winds and barometric disturbances. Since the size of lunar tides is only 1.5 to 3 inches, it causes less water displacement than seiches. From a recreational viewpoint, both seiches and lunar tides on Lake Superior are insignificant (50).

The Shoreline - The United States shoreline of Lake Superior is over 1,400 miles in length. Over 90 percent of the shoreline length is classified as bluff; the remaining 10 percent is divided about equally into marsh and beach. The north shore is characterized by rugged, rocky bluffs, or cliffs. The south shore is generally low bluff or beach.

Report #4 of the Outdoor Recreation Resources Review Commission entitled "Shoreline Recreation Resources of the United States" specifies that Lake Superior has 1,200 miles of recreational shoreline (62). About 110 miles or approximately nine percent of the mainland shoreline is in public recreation areas. This figure includes that shoreline contained in the Pictured Rocks National Lakeshore. If Isle Royale is included, the percent of shoreline in public recreation areas is much higher. Of the total shoreline existing within public recreation areas, about 25 miles are classified as beach (27).

Available for limited public use are extensive stretches of privately-owned shoreline. Much of this private shoreline is owned by mining and wood-using companies (such as the Cleveland-Cliffs, Kimberly-Clark, Calumet-Hecla, and Cellotex Corporations). These stretches of private shoreline provide a place for tourists to

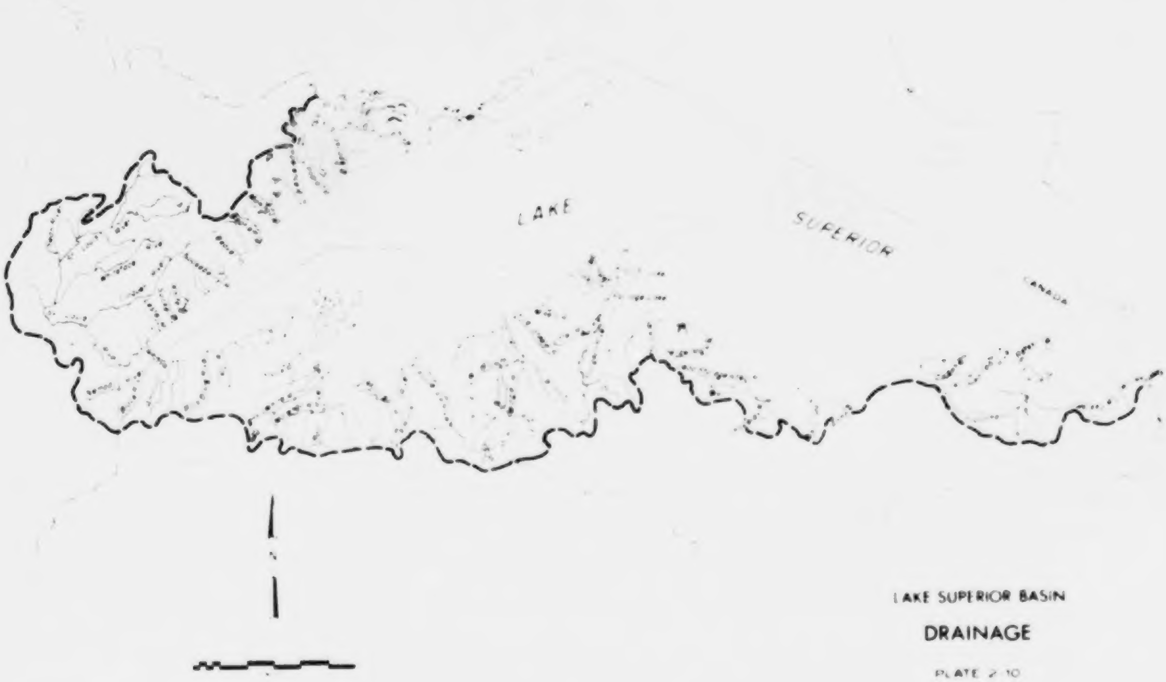
Plate 2-8. Lake Superior's rugged shoreline provides few sites of easy access. (Photo by Michigan Department of Natural Resources.)

Plate 2-9

The Lester River--a stream typical of Minnesota's North Shore area. Streams in other portions of the basin exhibit similar fast-flowing characteristics. (Photo by Minnesota Department of Conservation.)

swim, wade, hunt rocks, or merely get a closer look at the scenic Lake Superior shoreline.

Inland Bodies of Water - The Lake Superior Basin contains approximately 58,000 acres of inland lakes over 40 acres in size and thousands of miles of streams and rivers (42, 52, 116). Many of the streams run clear and cold; many of the inland lakes possess sandy beaches and are of excellent water quality. From a recreation standpoint, the relatively large amount of frontage in public ownership on many Lake Superior streams and lakes is a promising factor. The greatest obstacle to utilization of many bodies of water is the difficult accessibility. Many are situated in remote forested areas that have poor connecting roadways. This lack of accessibility has been instrumental in retaining the high esthetic quality which many hard-to-reach basin lakes and streams possess. The basin's largest inland lake, Lake Gogebic, found in Zone 2, is one of the more highly developed lakes. There are a number of large reservoirs found in Zone 3, the majority of which are located near Duluth. In addition, there are countless numbers of inland lakes ranging from a few acres in size to Lake Gogebic's 8,700 acres. Because of the narrowness of the Lake Superior watershed, many of the streams are relatively small. They range in size and swiftness from the narrow white water streams of the Minnesota north shore to the wider more passive St. Louis, Bad, and Kakagon Rivers.



LAKE SUPERIOR BASIN

DRAINAGE

PLATE 2-10

Land Use.

Urban - Table 2-2 indicates that less than three percent of the basin's land area is classified as urban. The majority of this development is found in and around the cities of Duluth, Minnesota; Superior, Wisconsin; Ashland, Wisconsin; Marquette, Michigan; and Sault Ste. Marie, Michigan.

Agricultural - Poor farming conditions tend to discourage any extensive agricultural activity in the Lake Superior Basin. Fair to poor agricultural soils, a very short growing season, long winters with low temperatures, heavy snowfalls, and the remoteness of farm market areas do not provide the conditions necessary for profitable involvement in farming. Only about five percent of the total basin is classified as cropland and pasture (see Table 2-2). The pasturing of livestock is the dominant agricultural activity. Potatoes, wheat, and hay are some of the more commonly grown crops in the Lake Superior Basin. While soils are poorly adapted to crop production, they are well suited for growing good stands of coniferous and hardwood forests. The Lake Superior Basin is a major source of lumber, pulpwood, and hardwood veneer logs.

Recreational - Portions of more than four million acres of public forest land in the basin have a potential for some type of recreational development. Also available for certain outdoor recreation activities are thousands of acres of privately owned land. Several large wood-using industries and mining companies allow hunting, fishing, and other general recreation activity on their lands. Recreation land use is not directly associated with a separate type of resource base. By their nature, agriculture, forestry, and urbanization are conflicting elements of land utilization. Recreation can be, to a degree, compatible with all three of these uses and is absorbed in the land categories listed in Table 2-2.

Zone 1. Considerable forest land containing numerous lakes and streams provides a more than adequate resource base for outdoor recreation in Zone 1. Although much of the interior of the region is only slightly rolling, contrast is provided by the steep,rocky shoreline, numerous waterfalls, and the relief of the Huron Mountains. The white sand beaches of Whitefish Bay, the great perched dunes near Grand Marais (Michigan) the sheer cliffs of the Pictured Rocks, and the famous Tahquamenon Falls are some of the outstanding natural features that constitute an attractive and valuable recreational resource. The soils are not well suited for farming and here, as in the other two zones, timber harvests can be conducted in a manner which does not conflict with most outdoor recreation activities. There is little urban development.

Zone 2. Generally, larger and more numerous lakes and streams are prevalent in Zone 2 than in Zone 1. Earlier attempts to develop farms on the cut-over lands were largely unsuccessful and much of the area is now covered with second growth timber. Due to its rolling terrain and geographical location, this zone has a natural advantage for winter sports. Heavy snow and low temperatures favor a long and quality winter recreation season (See Plates 2-3 and 2-4). This zone provides a contrast in natural features ranging from the high, heavily forested terrain of the Porcupine Mountains to the low lying ecologically significant Bad and Kakagon River sloughs.

Zone 3. Outstanding recreational features of Zone 3 include extensive forests, a multitude of lakes and streams, topography which lends itself to winter sports, and an outstandingly attractive Lake Superior shoreline. This zone contains the greatest amount of acreage classified as urban. However, nearly all of this is concentrated in the Duluth-Superior metropolitan area and the remainder of the zone has experienced very little development.

Table 2-2

LAND USE IN THE LAKE SUPERIOR BASIN, 1958

	Acres	Square Miles	Percentage
Rural			
Cropland	378,500	591	3.8
Pasture	108,000	169	1.0
Forest	8,668,100	13,544	87.6
Other*	431,700	675	4.4
Subtotal	9.586,300	14,979	96.8
Inland Lake	57,600	90	.6
Urban & Built-up Areas	255,600	399	2.6
Total	9,899,500	15,468**	100.0

* Other land - farmsteads, idle land, wildlife area, and other areas not classified into cropland, pasture, forest and woodland, and urban and built-up areas. Idle land includes land formerly used for crops and pasture, now abandoned and not yet reforested or put to other use.

** This figure not complete; unable to classify the difference in acreage between this figure and 16,900 - the actual number of square miles in the basin.

Source (42, 52, 116)

SOCIO-ECONOMIC FACTORS

Basin Development and Economic Foundation. For nearly three centuries the French Canadian Voyageurs were the dominant figures of the turbulent fur trading era in the Lake Superior country. It was this era which has provided most of the basin's present legacy. Many of the present day names of capes, points, coves, bays, and streams are the ones given them by the Voyageurs.

At nearly the same time that the fur trade was beginning, the first knowledge of the mineral wealth of the basin was exciting the imaginations of European adventurers. Modern copper mining began in earnest in the 1840's on the Keweenaw Peninsula, Isle Royale, and near Ontonagon, Michigan. The world famous mines near Houghton and Calumet produced millions of pounds of copper during their span of operation. Much of the once flourishing copper industry has slowed, and today active operations are limited to only a fraction of the once numerous mining areas.

With the completion of the first lock at Sault Ste.Marie on April 19, 1855, and the subsequent great demand for iron during the Civil War, there developed an iron ore mining boom. Since that time iron ore has continued to be of major importance in the manufacturing industry. Very recently, the use of pelletized ore has renewed the importance of iron mining.

During the late 1800's many persons turned to the forest and logging activities. However, lumbering activity quickly subsided after the greater bulk of Lake Superior's South Shore was logged during tne 20-year span between 1880 and 1900. Reforestation programs and natural regeneration have since restored nearly all of the areas formerly denuded of the great stretches of virgin forests.

Fisheries also gained importance during the late 1800's. With the advent of the chub and herring fishery and with the already established whitefish and lake trout fishery, this activity provided a flourishing industry around the turn of the century.

The wood product industries and farming in some areas became common after the decline of mining and logging activities. Many of the mining communities and lumbering centers that thrived prior to the turn of the century are now virtually

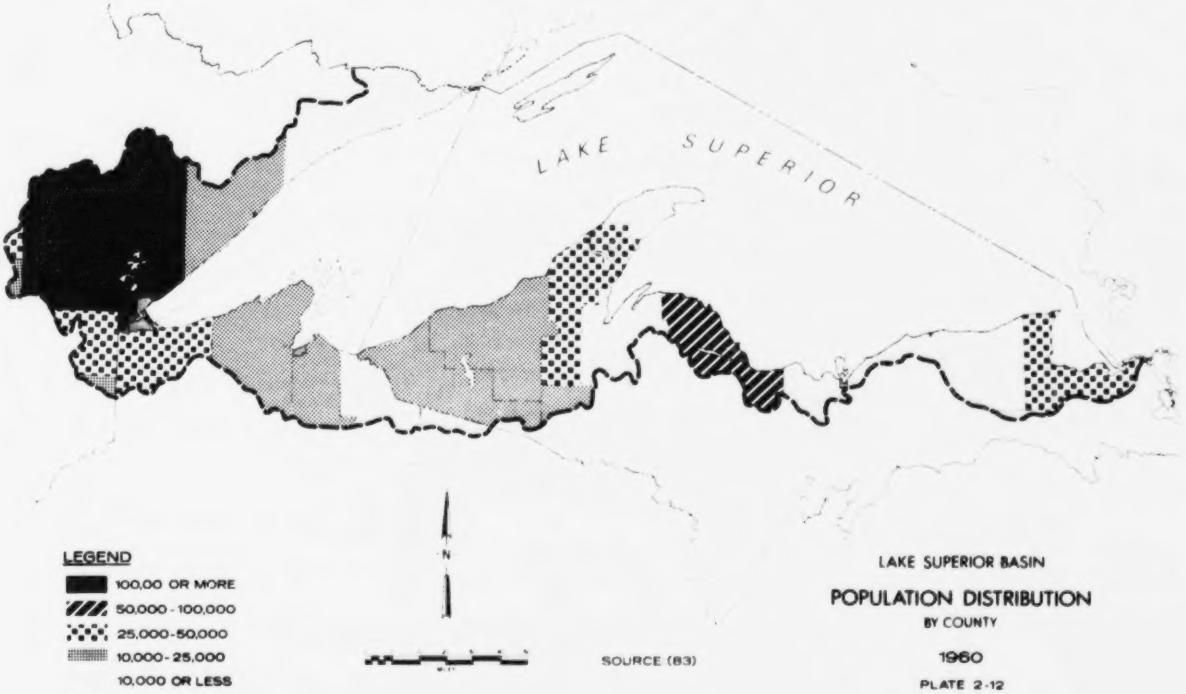
Plate 2-11. Although no longer active, copper mines in Michigan's Keweenaw Peninsula retain an interesting legacy of this area's past. (Photo by Michigan Tourist Council.)

ghost towns. The traditional types of resource development, such as shaft mining, sawlog lumbering, and unrestrained commercial fishing, ceased to be adequate or profitable (50).

The still abundant reserve of natural resources, however, has provided sufficient incentive to encourage the development of new techniques and methods which are providing a renewed vigor to the economy of the Lake Superior Basin. An important segment of the economy of the basin is that contributed by tourism and recreation. It is expected that tourism and outdoor recreation will demand an increasingly greater use of basin resources.

Resident Population. In 1960, the resident population of the Lake Superior Basin was nearly 0.5 million (Table No. A-1, Appendix A). The relative distribution of the basin's population shows that the most populated area is located in St. Louis County (more than 213,000 persons). With the exception of St. Louis and Marquette Counties, all other counties in the basin have populations of less than 50,000. The only SMSA located within the basin is Duluth-Superior. This SMSA comprises 52 percent of the basin's population.

Table 2-3 shows the present and projected population of the Lake Superior Basin. The basin's population is expected to increase 29 percent by 1990 and 66 percent



SOURCE (83)

LAKE SUPERIOR BASIN
POPULATION DISTRIBUTION
BY COUNTY
1960
PLATE 2-12

by the year 2020. The largest gains are predicted for Zones 1 and 3. Zone 1 contained only 17 percent of the basin's inhabitants in 1960. However, a 79 percent increase is expected in this zone by the year 2020. Zone 2 is expected to show only a 20 percent increase by the year 2000 and a 47 percent gain by 2020. In 1960, Zone 2 contained 20 percent of the basin's inhabitants. Population losses are anticipated in several of the least populated counties in the basin although the overall population is expected to increase. Zone 3 is by far the most populous zone in the basin. By 2020, the population of this zone is expected to exceed the 1960 population for the entire basin. This zone's population is expected to increase 69 percent between 1960 and 2020.

Table 2-3

PRESENT AND PROJECTED POPULATION
OF THE LAKE SUPERIOR BASIN
(In Thousands)

Zone	1960	1990	1960-1990 % Increase	2020	1960-2020 % Increase
Zone 1	82	112	37%	147	79%
Zone 2	95	114	20%	140	47%
Zone 3	294	382	30%	496	69%
Basin	471	608	29%	783	66%

Source (101, 104)

A comparison of land area to population for the three zones is portrayed in Plate 2-13 for the years 1960 and 2020. The ratio of land area to population for the two time periods is nearly equal in Zone 1 and is expected to change little by 2020. Whereas Zone 2 comprises 43 percent of the total basin land area, it contained only 20 percent of the total basin population in 1960, only a little more than the 1960 population of Zone 1. By the year 2020 it is anticipated that Zone 2 will make up only 18 percent of the basin's total population. Zone 3 contained 63 percent of the basin population in 1960 on only 39 percent of the total basin area. The ratio of land area to population in Zone 3 is expected to remain the same in the year 2020.

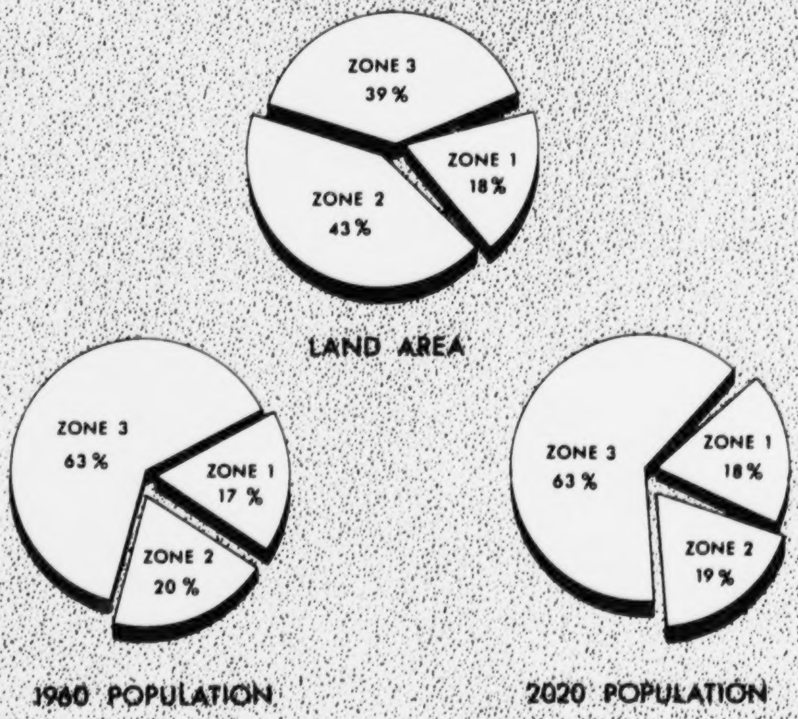
Income. Income greatly influences the degree to which people participate in outdoor recreation activities. "Outdoor Recreation for America" states, ". . . participation tends to go up as income does." Per capita income quadrupled nationally during the 1940-1960 period. In 1960 it was $2,217 and $1,437 for the nation and the Lake Superior Basin, respectively. In 1960 St. Louis County had the highest per capita income ($1,718) in the basin, while Aitkin County, located in Zone 3 reported a per capita income of only $986. ORRRC Report No. 23 predicts a national per capita income of $2,941 for 1976 and $4,104 for the year 2000 (65). If a similar trend occurs in the basin, it will still continue to exhibit a much lower income rate than the nation. This low per capita income will contribute to maintaining a lower than average participation of basin residents in some outdoor activities.

Generally speaking, participation in outdoor recreation tends to increase with increasing income; however, this may not always be so, since participation depends on other factors, such as the availability of leisure time and recreation resources.

PLATE 2-13

LAKE SUPERIOR BASIN

COMPARISON OF LAND AREA AND POPULATION BY ZONE



The presence of large tracts of public and available private forest lands with numerous lakes can be very instrumental in encouraging considerable participation of nearby residents in such activities as hunting and fishing. Participation of some residents in these activities is further encouraged during periods of the winter when occupational activity may be limited.

Leisure Time. In 1959-1960, a national study was made to determine the use of leisure time. Of all leisure time activities, outdoor recreation activities were mentioned one-sixth of the time. Insufficient time was mentioned by respondents as being a greater hindrance to participation in outdoor recreation than was income (64). However, the time factor is not likely to be as critical for the tourist or vacationist as it is among the resident population of an area seeking day-use or weekend activities.

Clawson estimates that outdoor recreation occupies about seven percent of our leisure time (16). The amount of leisure time available in the future will largely be determined by labor-management decisions which, at best, are difficult to anticipate. By 1976, it is estimated that the standard work week will average 36 hours for the industrial work force as compared to 39 hours in 1960. By the year 2000, the average work week may decline to 32 hours (61).

Education, income, and age composition are variables which, separately or in combination, affect the amount of leisure time available and to what degree this time will be devoted to outdoor recreation. Other factors which have a definite effect upon the use of leisure time are occupation, availability of facilities, and place of residence. The basin per capita income is very low in comparison to that of the nation. Generally, this would indicate that lower-than-average amounts of leisure time are probably devoted to some forms of outdoor recreation. On the other hand, participation of basin residents in hunting and fishing is probably higher than that for the nation. The availability of hunting and fishing opportunities appears to be overriding the influence of lower income. Even though projected income, education trends, and abundant resources promise more leisure time in the future, participation of basin residents in most forms of outdoor recreation will still continue to lag behind that of the nation.

Mobility. At present, the automobile heavily dominates the travel scene in this country, including travel for outdoor recreation pursuits. Our national automo-

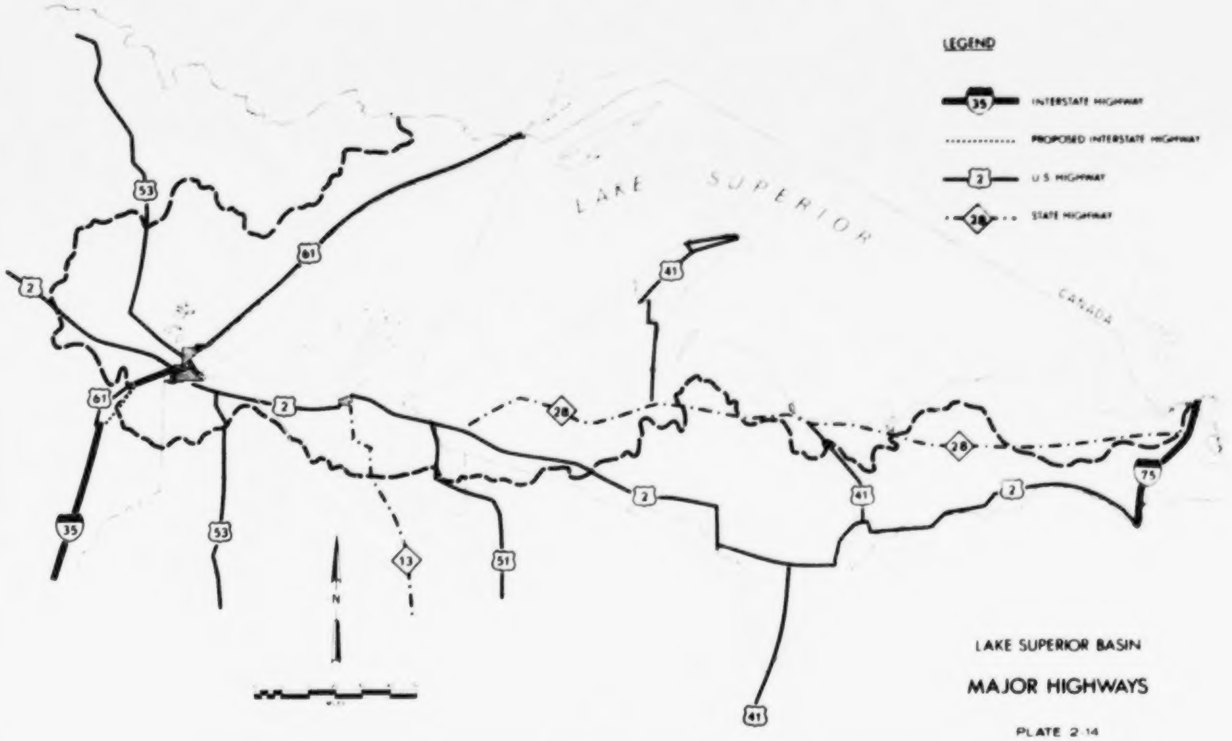
›ile transportation system consists of 75 million passenger cars, 3.6 million miles of roadways, numerous service facilities and accommodations for travelers, special public administrative and regulatory agencies, and supporting production and distribution facilities (65, 71).

The national system of interstate and defense highways was approximately half completed at the end of 1965 and 20,500 miles were open to traffic. U.S. Interstate 75, which extends from the Detroit metropolitan area, provides excellent access to Zone 1 of the basin. The completion of U.S. Interstate 35 will also provide ready access for residents of the Minneapolis-St. Paul SMSA to Zones 2 and 3.

Very little mileage of interstate highway exists in the Lake Superior Basin. While Interstate 75 in Michigan, Interstate 35 in Minnesota, and Interstate 94 in Wisconsin provide important access routes to the basin from major metropolitan areas, the movement of vacationists and other recreation seekers through the basin is accomplished on other federal and state highways. U.S. Highway 2 and Michigan State Highway 28 are the routes providing the major east-west movement of travelers across the basin. U.S. Highway 51 and Wisconsin State Highway 13, both originating from central Wisconsin, support principal movements of travelers to Lake Superior's south shore area in northern Wisconsin. U.S. Highway 41 is a route traveled by recreationists from Milwaukee and southern Wisconsin into northern Wisconsin and Michigan's Upper Peninsula. U.S. Highway 53 and U.S. Highway 61 provide access for travelers coming out of western Wisconsin and eastern Minnesota (including Minneapolis), respectively. U.S. Highway 53 continues through the western portion of Zone 3 and is the principal route into the Boundary Waters Canoe Area. U.S. Highway 61 passes through Duluth and continues along the northeastern Minnesota shoreline. It is the most outstanding scenic highway in the basin.

There are also secondary state and county roads leading to state and county parks and federal forest lands. Some of these secondary roads lead to major recreation areas such as Michigan's Porcupine Mountains State Park and the Pictured Rocks National Lakeshore. Some pass through scenic surroundings and offer fine sightseeing opportunities.

A study completed by the Bureau of Outdoor Recreation and released in April 1967 indicated that "Driving for pleasure rates as the nation's third most popular summertime outdoor recreation activity in the United States. During the summer,



LAKE SUPERIOR BASIN

MAJOR HIGHWAYS

PLATE 2-14

Americans engage in pleasure driving more often than in boating, hunting, fishing, or any other activity except walking for pleasure and swimming." (92). In the Lake Superior Basin, driving for pleasure is probably participated in more often than swimming due to highway scenic values and the existing cold water temperatures which discourage swimming. A comparison of the per capita ratio for automobiles indicates that the basin has only .17 automobiles per capita as compared to the nation's .32 (83, 104). However, the greater bulk of pleasure driving in the basin is associated with sightseeing which is accomplished primarily by vacationists and tourists. This does not imply that basin residents do not enjoy this activity. Many local people undoubtedly experience considerable esthetic satisfaction in driving over basin roadways to places of work or homes of friends and relatives. Because much of driving for pleasure occurs incidental to other activities (especially sightseeing), demand for this activity was not determined in this report.

Next to the automobile, the airplane is our most important mode of transportation. In 1964, the number of air passengers was more than 81 million, an increase of 14.5 percent over 1963 (71). It is predicted that air transportation will account for more than one-half of all trips over 500 miles in 1976. The City of Duluth has well developed airport facilities which are served by trunk and feeder airlines. Other airports of consequence are located in Sault Ste. Marie, Marquette, Houghton, and Ironwood, Michigan; Ashland and Superior, Wisconsin; and Hibbing, Minnesota. There are numerous smaller airports and landing strips scattered throughout the basin which can accommodate only smaller aircraft. While increasing ease and economy of air travel is growing, the number of tourists and vacationists traveling to the basin by airplane will probably remain negligible for some time to come. Travel to the wide variety of resource attractions dispersed throughout the basin requires some form of vehicular transportation for basin visitors.

At present, railroads are relatively unimportant as a mode of transportation in the Lake Superior Basin. They should, however, be recognized as a mode of transportation with considerable potential for the movement of travelers in many sections of the country. A reevaluation of the need and usefulness of railroad passenger service by industry and government, coupled with a new outlook by the railroads themselves, could reverse the declining trend of the past 20 years.

Other Demographic Characteristics.

Employment - The ample availability of raw materials (timber and minerals) and the operation of farms under the limitations of a short growing season and in-fertile soils are two factors greatly affecting basin employment.

Dairying is the principal farming activity, but many farmers produce potatoes, hay, beef cattle, sheep, and poultry. Many farm owners cut timber during the winter and operate their farms during the summer. The farms in the basin are less prosperous than farms farther to the south. In 1960 the total number of persons employed in agriculture in the basin numbered 6,500 (104).

Duluth-Superior is the basin's major ore transshipping port, although there are also important ore docks at Marquette, Michigan, and at Ashland, Wisconsin. Manufacturing and mining (copper and iron) account for most of the basin's employed population at present. In 1960 manufacturing employment totaled 27,500 persons while mining employed more than 21,000 persons (104).

Throughout this region, both within the metropolitan areas and outside of them, the rate of economic growth has been low in recent years. As many forest and mining

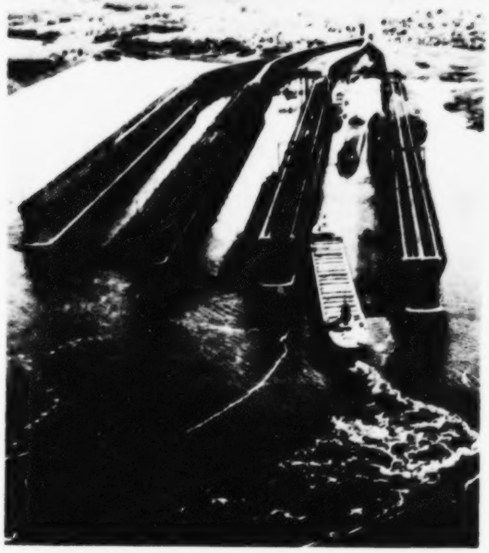


Plate 2-15. The world's largest iron ore docks are found at Superior, Wisconsin. (Photo by Wisconsin Department of Natural Resources.)

Plate 2-16. Cutting timber is a part-time occupation during the winter months for some residents of the Lake Superior Basin. (Photo by Michigan Department of Natural Resources.)

industries have declined, new activities have managed to do little more than replace those that have died out. Rather than moving northward, manufacturing industries have been locating in the southern regions of the United States in favor of a more suitable climate, lower wage scales, and the availability of labor and market areas. However, mining is and will continue to be a most significant economic factor in the basin's economy. The change from standard ores to the use of concentrated pelletized ore has stimulated iron ore mining activity in the basin. The Lake Superior Basin accounted for approximately half of the iron ore production of the United States in 1965 (104).

Although manufacturing activity has declined in importance, it is anticipated that income and leisure time will continue to increase during the next four decades. This will tend to increase participation by basin residents in outdoor activities. More importantly, the number of tourists and vacationists from origins outside of basin boundaries will increase in number and will place higher demands on outdoor recreation facilities. Catering to tourists has become a major source of income for some basin residents. Tourism and the provision of summer recreation facilities is an element which has stimulated new growth in the rural areas.

Urban-Rural Ratio - For comparative purposes, the urban-rural ratio provides an index of spatial location as well as an indicator of expected recreation activity by a given population. The ORRRC studies reveal that urban people are more active in outdoor recreation pursuits than rural people. Furthermore, suburbanites participate more actively than do persons from the central city. On the other hand, rural farm residents usually have the lowest participation rates. As previously pointed

Table 2-4

PRESENT AND FUTURE URBAN-RURAL RELATIONSHIP
LAKE SUPERIOR BASIN

	1960	2000
Population	471,000	650,000
Percent Urban	66	70
Percent Rural	34	30

Source: (83, 104)

out, however, participation by the rural population in activities such as hunting and fishing tends to be higher than that of city residents and suburbanites. Table 2-4 gives an insight into the urban-rural relationship.

The basin's population is expected to increase 30 percent by the year 2000. During this period the rural population will experience an eight percent drop in proportion to the total basin population, although it will gain people in absolute terms.

Age - If we assume that other factors are equal, age has a significant influence on participation in certain outdoor recreation activities. Older people tend to engage in less outdoor activity than do younger persons. This is particularly noticeable in such active pursuits as water-skiing, swimming, and snow skiing. It must be noted, however, that rates of participation in the passive types of recreation (nature walks, walking for pleasure, sightseeing, etc.) are only slightly less among older persons than among younger people. The Lake Superior Basin has a median age of 29.3 years as compared to the national median of 29.5 years (85). While this difference in age for the basin as a whole does not appear to be significant, it is suspected that the basin's cities tend to have a greater percentage of younger persons than do outlying rural areas, indicating greater per capita participation. Table 2-5 indicates that the basin's population will consist of a greater number of younger persons in the future.

Table 2-5

AGE DISTRIBUTION - 1960 AND 2000

LAKE SUPERIOR BASIN

Age Group	1960	2000
Under 15	30%	30%
15-34	26%	31%
35-64	34%	29%
65 and over	10%	10%

Source: (65, 84)

Education - Education affects participation in outdoor recreational pursuits in much the same way as income, i.e., the higher a person's educational attainment, the greater his participation tends to be. This is particularly true in the case of swimming, playing games, sightseeing, and walking and driving for pleasure (61).

Table 2-6 indicates that the median school years completed for resident adults is equal to the national average.

The cities of Duluth, Minnesota; Marquette, Michigan; Ashland, Wisconsin; Sault Ste Marie, Michigan; and Houghton, Michigan, all have colleges, indicating not only a considerable number of younger persons, but persons having an above average education in many of the basin's major cities.

Table 2-6

COMPARISON OF U. S. - BASIN
LEVELS OF EDUCATIONAL ATTAINMENT - 1960
(persons 25 years and over)

	United States	Lake Superior Basin
Median School Years Completed	10.6	10.6

Source: (83)

The Vacationing Population and Tourism. In 1964, an estimated 1.4 million vacationists came to the Lake Superior Basin for the primary purpose of outdoor recreation (21, 24, 41). The vacation sector comprises approximately 80 percent of the basin's total effective population. This approximation does include a few basin residents, but by far the greater number are non-residents.

A 1964 study by the Michigan State Highway Department reports that the average trip cost of tourist parties was $116, and the average expenditure per day had approached $25 (approximately $7 per person). The average length of stay was five days and the average size of party was 3.5 persons (41)*. The typical tourist:

--resided in Michigan or one of the neighboring States of Ohio, Indiana, Illinois, or Wisconsin.
--drove the family car on his vacation trip.
--likes to view scenery in his travels and especially preferred to follow Michigan's shoreline highways on circle tours of the Great Lakes.
--made his vacation visit in June, July, or August.
--preferred motel accommodations in his travels although camping-out is gaining in popularity.

*The five-day length of stay is for the entire State of Michigan. A longer average time period could be expected for the Lake Superior Basin e.g. (northeast Wisconsin - 7.4 days).

A more recent study entitled "The Potentials of Commercial Tourism in the Upper Great Lakes Area" estimated that $34 million was spent at commercial lodging establishments in the basin in 1964. It further indicated a daily per capita tourist expenditure of $9 in 1967.

This study, which includes roughly the northern halves of the States of Michigan, Minnesota, and Wisconsin, estimated an increase to $15 in 1977 (12). This study is discussed further in Chapter 7 under the section entitled "Promotion of Tourism."

If it is assumed that 1.4 million tourists stayed an average of six days in the basin and spent an average of $9 per day/per person, the total tourist expenditures for the basin in 1967 would have been $75 million.

The vacation sector does at present and in the future will undoubtedly continue to provide the greater number of participants in utilizing basin resources and facilities. In addition to the influence of recent basin recreation developments discussed in this report, increases in the number of tourists traveling to the Lake Superior Basin will very likely be contingent upon the development approach taken in the future by responsible public resource managing agencies and private enterprise. The development alternative stressing the promotion of tourism and more intensive development of Upper Great Lakes resources is discussed in Chapter 7 under "Promotion of Tourism."

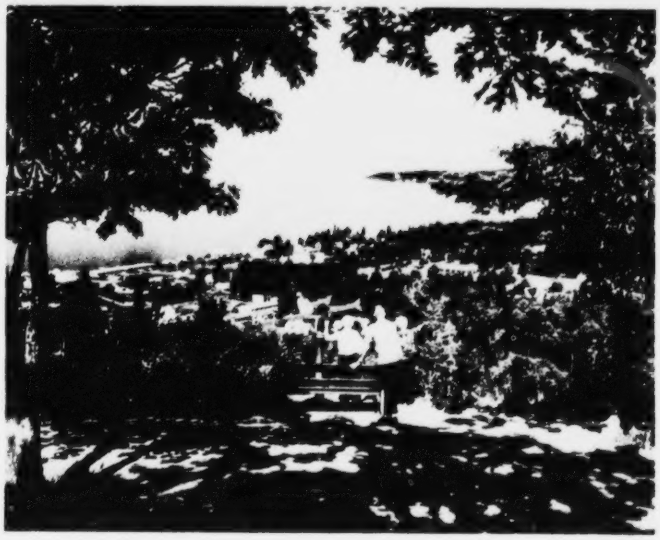
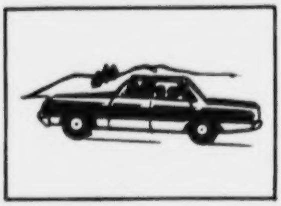


Plate 2-17. Copper Harbor lies at the tip of Michigan's Keweenaw Peninsula. It is one of the basin's more popular destinations for tourists. (Photo by Michigan Tourist Council.)



Chapter 3
Demand

ZONE OF INFLUENCE

By definition the zone of influence is that area from which all recreation seekers come to utilize a particular basin's resources. It comprises those areas from which vacationers, as well as day and/or weekend users, come and includes east-west travelers passing through the basin. For the purpose of this report, the boundary of the zone of influence is considered to be within a 500-mile radius, but it could, of course, reach beyond this limit.

RECREATION MARKET AREA

By definition the recreation market area is that source from which approximately 80 percent of the people who participate in outdoor recreation are drawn on one-day outings or weekend (overnight) trips to the program area under consideration. For the purposes of this report, the Lake Superior Basin and the SMSA's within a 125-mile radius of its boundaries comprise the recreation market area. In the Lake Superior Basin, the recreation market area is the source of only 20 percent of the total recreation demand.

VACATION DEMAND

A brief explanation of the procedure used in determining demand generated by visiting vacationists and tourists is presented on Page B-5 in Appendix B of this report. This portion of the demand includes only those persons visiting the basin for time periods of three nights or longer. Many persons in this category travel to the basin from considerable distances, nearly all of them from distances exceeding 125 miles. The demand generated by this sector accounts for about 80 percent of the total basin outdoor recreation demand.

METHODOLOGY

Recreation demand is an expression of total participation that could be expected in general outdoor recreation activities if adequate opportunities were available. Demand, therefore, comprises two components: (1) the expressed demand represented by use of existing facilities, and (2) the latent or unexpressed demand which is inherent in a population but not reflected in the use of existing facilities. Generally speaking, use records are inadequate or unreliable for many of the recreation facilities operated by local units of government. Latent demand, on the other hand, is not directly measurable because of its dependence on the individual desires of people and the creation of new outdoor fads by manufacturers. Consequently, indirect methods have been used for the measurement of present and future demand (90).

In the analysis of the recreation market area demand in the basin, it was found that the ORRRC studies presented the most applicable information. The demand methodology described in Appendix B utilizes participation rates to facilitate estimating the number of times a person will participate in various activities during a year. Since participation is at its peak for most water-oriented activities during the summer, activity occasions were determined for the three-month summer period as well. The demand placed upon the recreation resources of the basin was evaluated for the recreation market area and for the vacation sector.

Outdoor recreation activities considered in this report include:

Water-dependent	Water-enhanced	Winter Sports
Swimming	Camping	Ice Skating
Fishing	Picnicking	Snow Skiing
Boating	Sightseeing	Sledding
Water-skiing	Nature Walks	Snowmobiling.
Canoeing	Hiking	
Sailing	Hunting	

These activities are obviously not all the recreational activities engaged in, but they represent those considered most important in association with water and water quality. In the case of winter sports, four activities were selected. Ice skating and sledding are traditional winter activities, whereas snow skiing and snowmobiling were considered because of their expected expansion and probable effects upon headwater areas.

Because of its relatively recent arrival on the recreation scene, and the difficulty in measuring exact participation, the number of snowmobiling activity occasions was not determined. There is, however, no question that this activity does and will continue to have a significant impact on outdoor recreation in the basin. It may be that snowmobiling activity now exceeds that of all other winter activities in the basin.

INFLUENCING FACTORS

Socio-Economic. The present and future demand for outdoor recreation opportunities is dependent upon a number of continually changing socio-economic factors. Carlson et al indicate seven factors that may influence future recreation demands: (a) automation and new sources of power, (b) increased leisure, (c) increased income, (d) better health and greater longevity, (e) a higher standard of living, (f) greater mobility, and (g) population changes (11).

As presented in the preceding chapter, the basic socio-economic factors considered in the recreation demand analysis are population, income, leisure, and mobility. Individually these factors contribute substantially to the total demand picture, but when viewed collectively, there exists an interrelationship of dynamic proportions. Other factors supplement these socio-economic characteristics, but the extent to which each directly affects the demand for outdoor recreation depends largely upon the specific characteristics of various population groups.

Opportunity. If the opportunity for participation in a selected activity is readily available, people will tend to participate more than they would if opportunities are limited. An opportunity factor, which reflects opportunity for participation in the basin, is represented by a time-distance element which is discussed in the demand methodology in Appendix B.

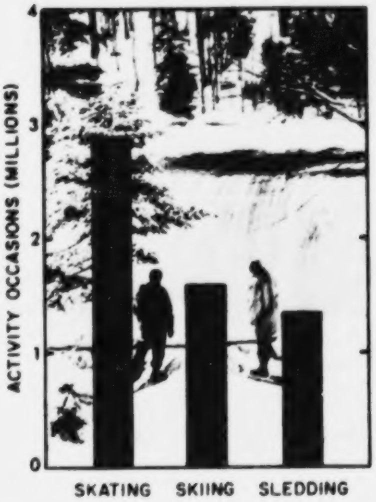
Quality of Facilities. Closely allied with the opportunity factor is the quality of the available facilities. Results of a survey discussed in ORRRC Study Report No. 20 infer that participation in most activities tends to increase in proportion to the quality of the supporting facilities. However, in some instances relatively poor quality areas receive heavy use, particularly near metropolitan areas.

PRESENT DEMAND

In 1965 there were approximately 41 million recreation activity occasions of demand for water-related outdoor recreation activities in the Lake Superior Basin (see Table 3-1). Of this annual recreation demand, approximately 69 percent was attributable to summer recreation activities. Water-dependent activities comprise 40 percent of the yearly demand total and about 46 percent of the total summer demand. The figures shown in Table 3-1 are a consolidation of the demand estimates for the recreation market area and for the vacation sector. Total annual and summer demand by outdoor recreation activities is graphically portrayed in Plate 3-2. Winter activities are shown in Plate 3-1. These graphs depict a consolidation of the day and overnight or weekend demand and the vacation demand.

PRESENT ESTIMATED DEMAND
WINTER ACTIVITY OCCASIONS

LAKE SUPERIOR BASIN



Source TABLES B-1 and B 2

PLATE 3-1

Table 3-1

SUMMARY OF WATER-ORIENTED RECREATION DEMAND
LAKE SUPERIOR BASIN, 1965

(Market Area and Vacation Sector)

Activity Type	Annual Activity Occasions (1000)	Summer Activity Occasions (1000)	Summer as a Percent of Annual
Water-dependent	16,615	12,902	76%
Water-enhanced	23,961	15,363	62%
Winter Sports	587	n.a.*	--
Total Water-oriented	41,163	28,265	69%

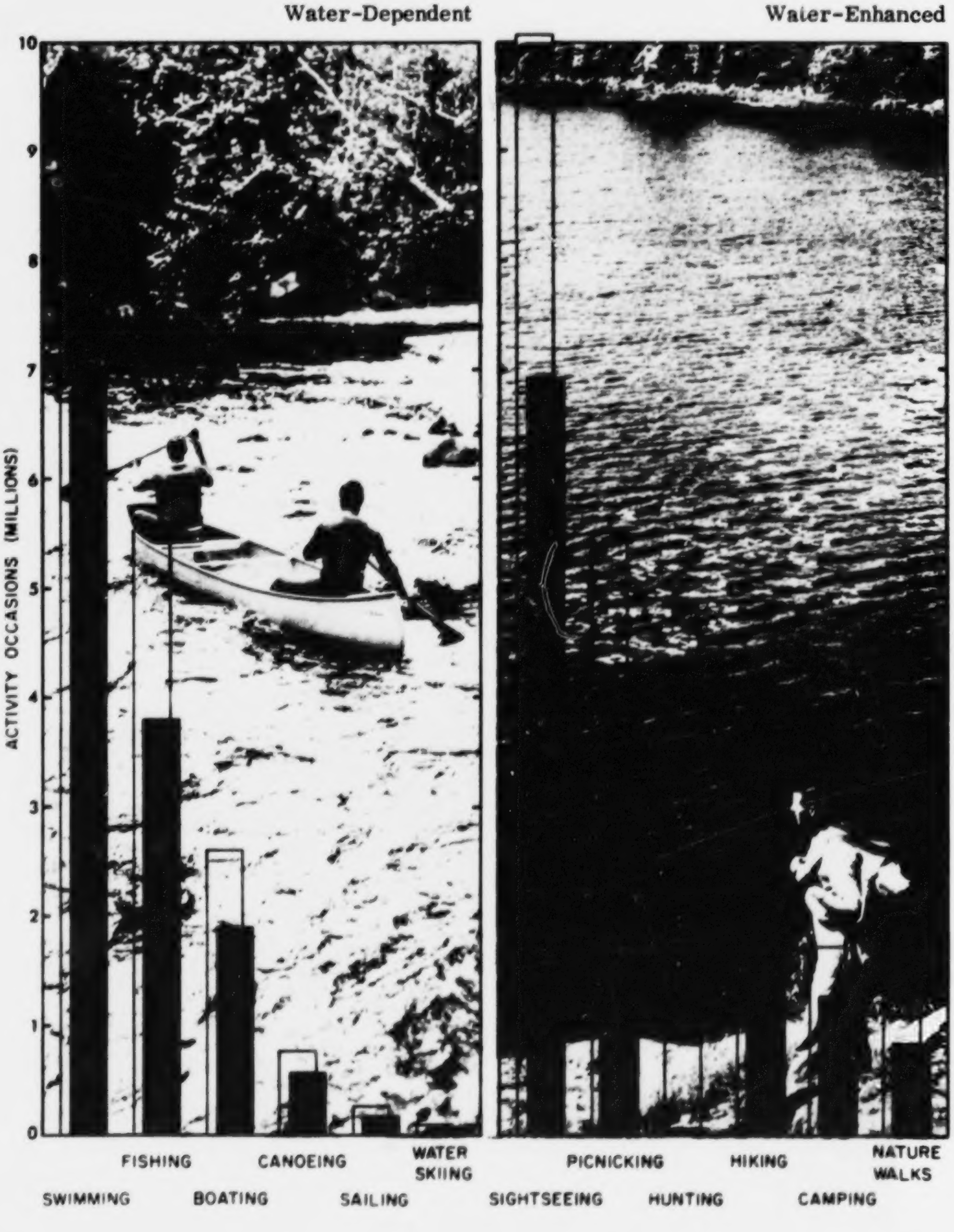
*Not applicable

FUTURE DEMAND

Demand for recreation activities within the basin has been projected to the year

DEMAND FOR SELECTED WATER-ORIENTED OUTDOOR RECREATION ACTIVITIES

LAKE SUPERIOR BASIN, 1965



Source: TABLES B-1 and B-2

□ ANNUAL ■ SUMMER

PLATE 3-2

2020. Using ORRRC Study Report No. 26 as a source for future demand projections, it was necessary to extend data for the years 1976 and 2000 to obtain projected demand figures for the year 2020. Both "with opportunity" and "without opportunity" projections were calculated in order to present a range of probable activity occasions for water-oriented activities (See Table B-3, Appendix B). "With opportunity" (as defined in ORRRC Study Report No. 26) assumes an improvement from 1960 quality and quantity of facilities on a per capita basis, while "without opportunity" assumes a continuation of existing quality and quantity of facilities. These terms are applied nationwide and are relevant to the specific quality and quantity of facilities offered by public and private agencies within the basin.

Based on the information shown in Table B-3, it is anticipated that the summer recreation demand of the market area sector will increase by 63 and 95 percent by 2000 and 2020, respectively, providing there will be a continuation of 1960 quality and quantity of facilities. If an improvement in present conditions occurs, the three-month demand will increase by 95 and 137 percent by the years 2000 and 2020, respectively. Table 3-2 shows projected demand increases for the Lake Superior Basin.

Table 3-2

PROJECTED SUMMER OUTDOOR RECREATION DEMAND
(Based on Anticipated Increases in Market Area Demand)
(LAKE SUPERIOR BASIN)

	Activity Occasions (Millions)		Index of Change	
Year	Without Opportunity	With Opportunity	Without Opportunity	With Opportunity
1960	4.3	4.3	100	100
2000	7.0	8.4	163	195
2020	8.4	10.2	195	237

Source: Table B-3, Appendix B.

The present and projected small effective population and low per capita income that now exist and are anticipated for the future combine to make the projected market area demand for outdoor recreation much less in the Lake Superior Basin than in the other Great Lakes Basins. The unpredictability of future vacation and tourist use in the Lake Superior Basin does not allow for any highly reliable measure of this important sector in future total demand. However, for purposes of this report, it was assumed that future increases in the numbers of vacationists and tourists visiting the Lake Superior Basin are more likely to be dependent on national rather than basin population growth and per capita income increases. Undoubtedly there will be an increase in tourism, especially in light of the newly acquired national status given the Pictured Rocks National Lakeshore. An even greater increase in tourism could be expected if the Apostle Islands were to be authorized as a national lakeshore. In addition, there are other developments which are occuring or which may occur in the future that could increase recreation activity in the basin. These developments have been discussed elsewhere in this report. Larger numbers of tourists will, in turn, create a considerable need for additional outdoor recreation facilities.

Increases in participation of all outdoor activities can be expected to occur in the future. Participation in certain activities that do not now constitute a substantial share of the total recreation demand may increase much more rapidly than that of the others. Depending on various factors such as changing attitudes, new legislation, and future facility development, participation in certain activities such as snow skiing, pleasure boating, and canoeing may greatly increase.

ZONE DEMAND

An attempt was made to disaggregate the basin demand for outdoor recreation activities into the three zones. In determining the zonal market area demand, a method similar to that used in calculating the basin demand was utilized, viz., an income index was derived in order to gain an estimate of the propensity for participation in the respective zones. A comparison of the national forest camp-ground and state park attendance figures in each zone to those of the state totals was used as an aid in allocating tourist demand to each zone. An explanation of this procedure is shown in Appendix B. The results of the zone calculations are shown in Table 3-3 on page 3-8.

It is apparent from the table that the market area demand (that demand for overnight and weekend recreation pursuits) comprises a much greater proportion of the total demand in Zone III than in either Zone I or Zone II. This reflects the influence of the Duluth-Superior metropolitan area.

Table 3-3

SUMMARY OF ZONE DEMANDS, 1965
MARKET AREA AND VACATION SECTOR
(Activity Occasions - Thousands)

	Market Area Demand	Vacation Demand	Total Demand	Percent of Basin
Zone 1	1,735	10,656	12,391	30
Zone 2	2,819	16,374	19,193	47
Zone 3	4,121	5,458	9,579	23
Basin	8,675*	32,488**	41,163	100

*Total of Column 4, Table B-1

**Total of Column 3, Table B-2

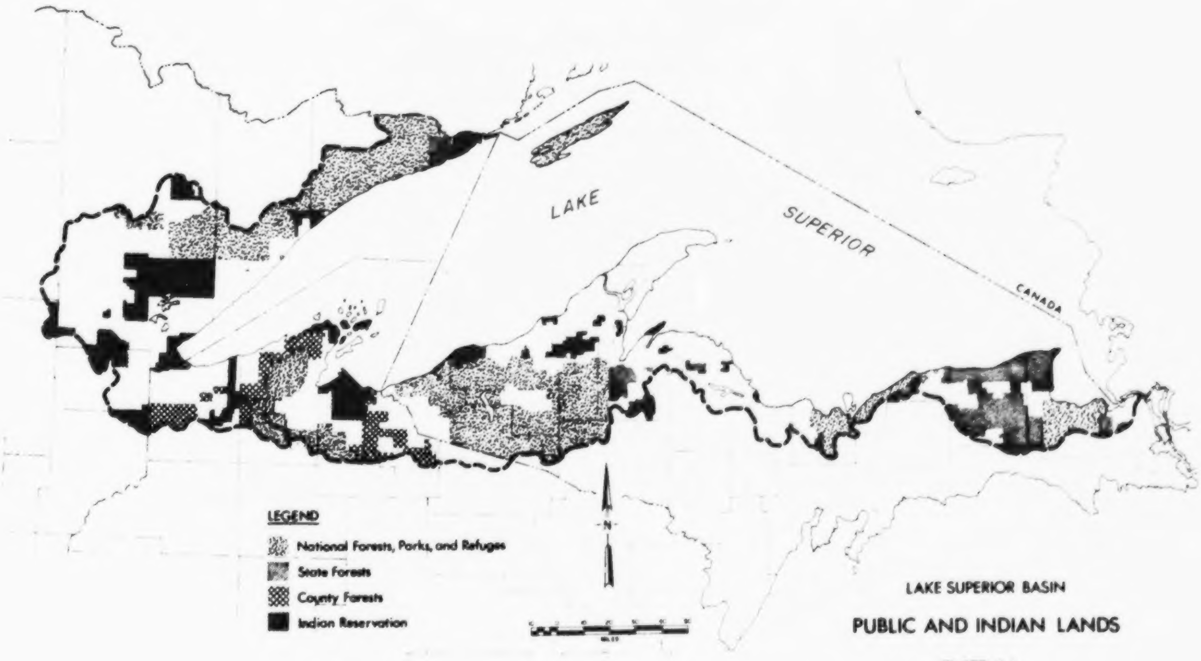
Chapter 4
Supply

PRESENT RECREATION FACILITIES

Public. The Lake Superior Basin has 4,108,000 acres in public forest, park, and wildlife lands (See Table A-2). Both state and federally owned forest lands comprise significant portions of the total undeveloped public lands throughout the Lake Superior Basin. A considerable amount of county forest lands is also present in the Wisconsin and Minnesota portions of the basin (See Plate 4-1). Although public ownership does front for considerable distances on many of the basin's smaller inland lakes and streams, much of the land bordering on the basin's larger inland bodies of water is controlled by private interests. With the exception of existing state parks, the Pictured Rocks National Lakeshore, and certain locations at which national and state forest boundaries front on Lake Superior, most of the Lake Superior shoreline is under private ownership (See description of the Lake Superior shoreline on page 2-9).

If access is available, hunting and fishing activities can utilize undeveloped land, but most other recreation activities require some facility development. In the Lake Superior Basin.access for these two activities is available on much of the private forest tracts as well as on publicly owned forest lands. The U.S. Forest Service has estimated that hunting and fishing account for 50 percent of the recreation use on the national forests in the basin.

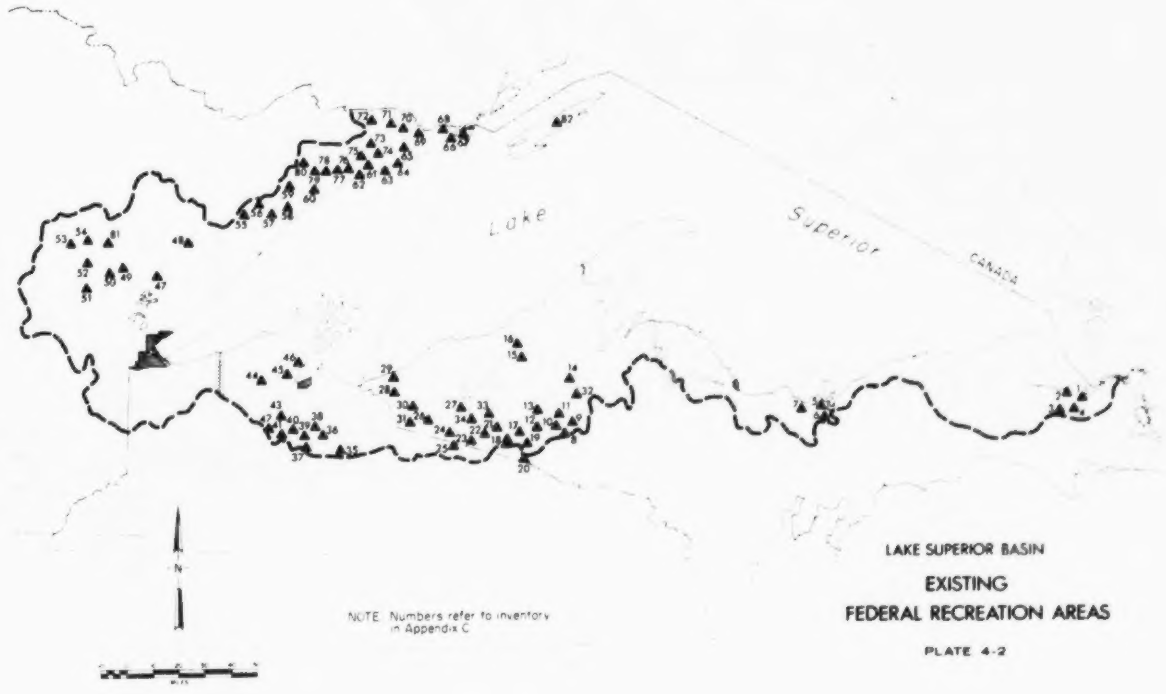
The respective state resource management agencies, namely, the Michigan Department of Natural Resources, the Minnesota Department of Conservation, and the Wisconsin Department of Natural Resources, manage those lands having the greatest extent of development for public outdoor recreation use. Table B-4 on page B-6 indicates that the state administered areas comprise approximately 60 percent by



LAKE SUPERIOR BASIN

PUBLIC AND INDIAN LANDS

PLATE 4-1

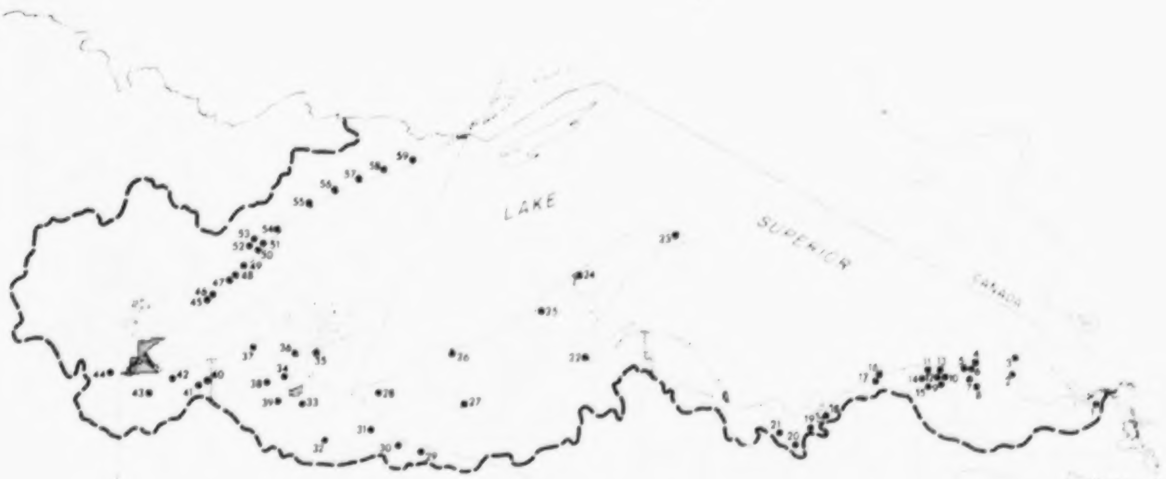


NOTE: Numbers refer to inventory in Appendix C

LAKE SUPERIOR BASIN

EXISTING FEDERAL RECREATION AREAS

PLATE 4-2

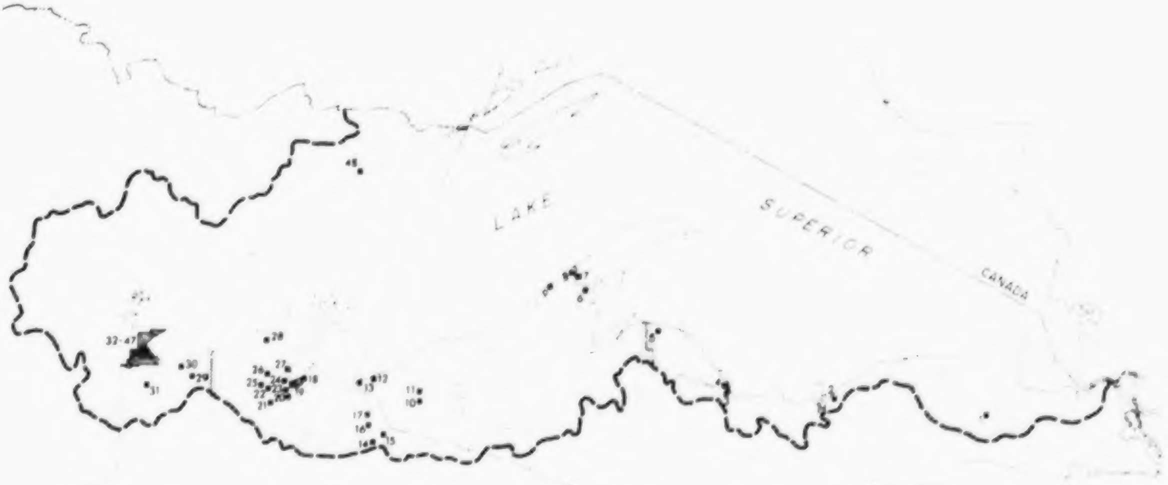


NOTE: Numbers refer to inventory in Appendix C

LAKE SUPERIOR BASIN

EXISTING STATE RECREATION AREAS

PLATE 4-3



NOTE: Numbers refer to inventory in Appendix C

LAKE SUPERIOR BASIN

EXISTING LOCAL RECREATION AREAS

PLATE 4-4

area of the total federal, state, local, and privately developed recreation lands. In the Lake Superior Basin, 0.2 percent of the public lands are developed for recreation pursuits. The recreation inventory in Appendix C and the map on Plate 4-2 indicate a considerable number of existing federal recreation areas, however, the amount of developed recreation land in federal forest lands is not great. Most of these areas are national forest campgrounds which, in combination with associated picnic grounds, swimming beaches, boat launching sites, and surrounding largely undeveloped forest lands, provide the opportunity for individuals to experience the finest in uncrowded recreation activity.

Public programs and resources in the basin provide for nearly all forms of outdoor recreation. Appendix C provides data on existing recreation areas such as visitation statistics, acreages (when available), watershed location, and a list of available water-oriented recreation activities.

Available recreation facilities and areas of recreational importance are discussed later in this chapter under the section "Recreation Attractions and Facilities by Zone." In addition, basin maps depicting the location of various activity facilities are found in this chapter.

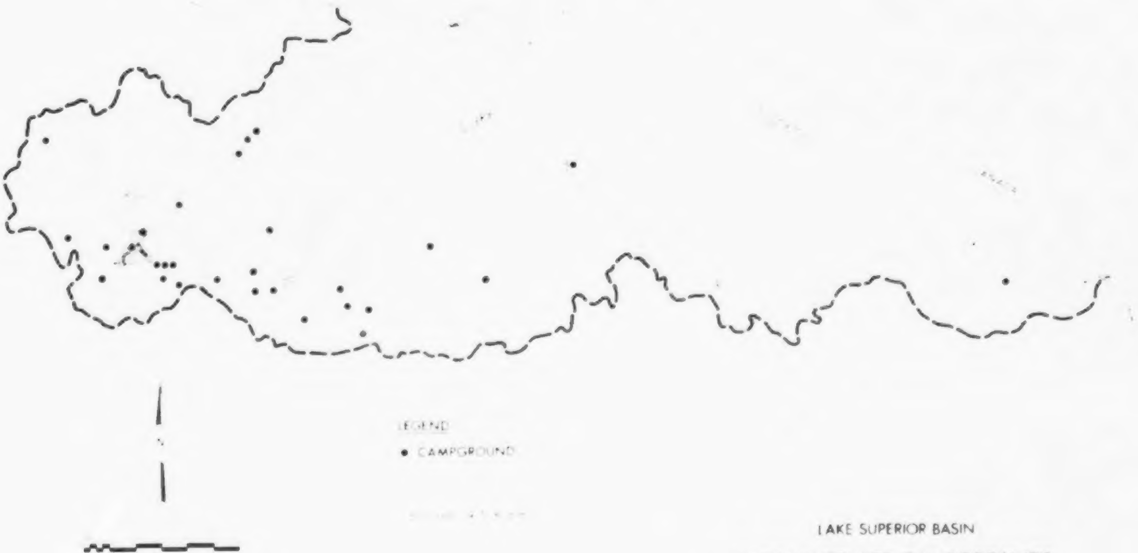
Private. Although private recreation development is not as extensive in the Lake Superior Basin as in the other Great Lakes Basins, it is nevertheless an important part of the total recreation supply picture. There are developments of major importance in skiing and camping. Charter boat operations provide an opportunity for those seeking it to experience Great Lakes fishing for salmon and lake trout. Cabin and motel operations provide a valuable service in supplying convenient travel facilities for tourists. Commercial establishments, in conjunction with properties purchased by the owner for the purpose of guaranteeing him a desirable recreational resource, help to fulfill the demands of many resident and nonresident recreationists.

A significant number of private seasonal homes are found at certain locations in the basin. Most vacation homes are concentrated in areas adjacent to or near water. Such locations include the area around Duluth-Superior, Michigan's Keweenaw Peninsula, and areas near Munising, Marquette, and Sault Ste. Marie, Michigan. Although some seasonal residences are a source of recreational opportunity within themselves, most owners also rely on resources beyond their own property lines.

Public and commercial installations cater to the desires of seasonal home owners: the public agencies provide the more basic resources, while the commercial establishments serve those in quest of unusual, specialized, and more expensive facilities.

Complete and reliable inventory data are not available for a thorough analysis of the private sector; therefore, consideration has been limited to a more general approach.

Group and Organization Camps - In the Lake Superior Basin are found six group and organization camps accredited by the American Camping Association (39). Church, ethnic, fraternal, and service organizations usually operate and maintain such camps. In certain instances, government agencies lease public land to these organizations with the understanding that any change in the landscape must correspond with the leasing agency's prescribed standards. Organization camps frequently provide the recreational and educational opportunities to that segment of the population unable to utilize public or commercial facilities. Transportation, lodging, food, and guidance are often provided at minimal cost.



LAKE SUPERIOR BASIN

EXISTING PRIVATE CAMPGROUNDS

PLATE 4-5

Private Campgrounds - In the Lake Superior Basin, a total of 32 private camping areas provide 603 campsites (4, 5, 6, 68). Frequently located near public recreation facilities, private campgrounds perform a dual function (See Plate 4-5). They accommodate a class of clientele preferring the atmosphere of a private installation and also absorb overflow from public areas during peak recreation seasons.

Winter Sports - The large investment needed to develop and maintain a winter sports area--especially one offering ski lifts, an ice skating rink, restaurant, lounge, and lodging--makes it financially desirable that such an enterprise maintain a resort atmosphere through the summer months. Golf courses, riding stables, fishing and boating ponds, youth programs, and chair lift rides replace skiing, tobogganing, and ice skating as the primary attractions. All ski areas in the Lake Superior Basin are privately owned with the exception of one in Porcupine Mountains State Park. Snowmobiling has become a very popular wintertime activity throughout the basin. At the present time, its popularity probably surpasses that of skiing. By far the largest number of snowmobile trails and areas are on public lands. Private interests, however, do provide a few areas for snowmobilers in the basin.

Boat Rental and Marina Facilities - It is common practice for many resorts and other privately operated tourist accommodations to offer boat rentals and marina facilities for the convenience of their visiting clientele in addition to supplementing their income. Canoe liveries are an exception to this generalization in that they provide the principal source of income for their owner. Presently, there are very few private canoe liveries in the Lake Superior Basin. Unlike the Lake Huron and Lake Michigan Basins, where thousands of weekend canoeists ply basin streams with rented canoes, the Lake Superior streams suitable for canoeing are located some distance from southern Michigan, Minnesota, and Wisconsin population centers. In addition, many basin streams, particularly those along Minnesota's North Shore, are unsuitable for canoeing. Most canoeists using basin waters are probably either residents or persons living near the basin.

Marinas and harbors of refuge on Lake Superior are largely publicly owned and operated. There are some privately owned marinas found at various inland waters where public facilities are lacking.

Recreation Attractions and Facilities by Zone.

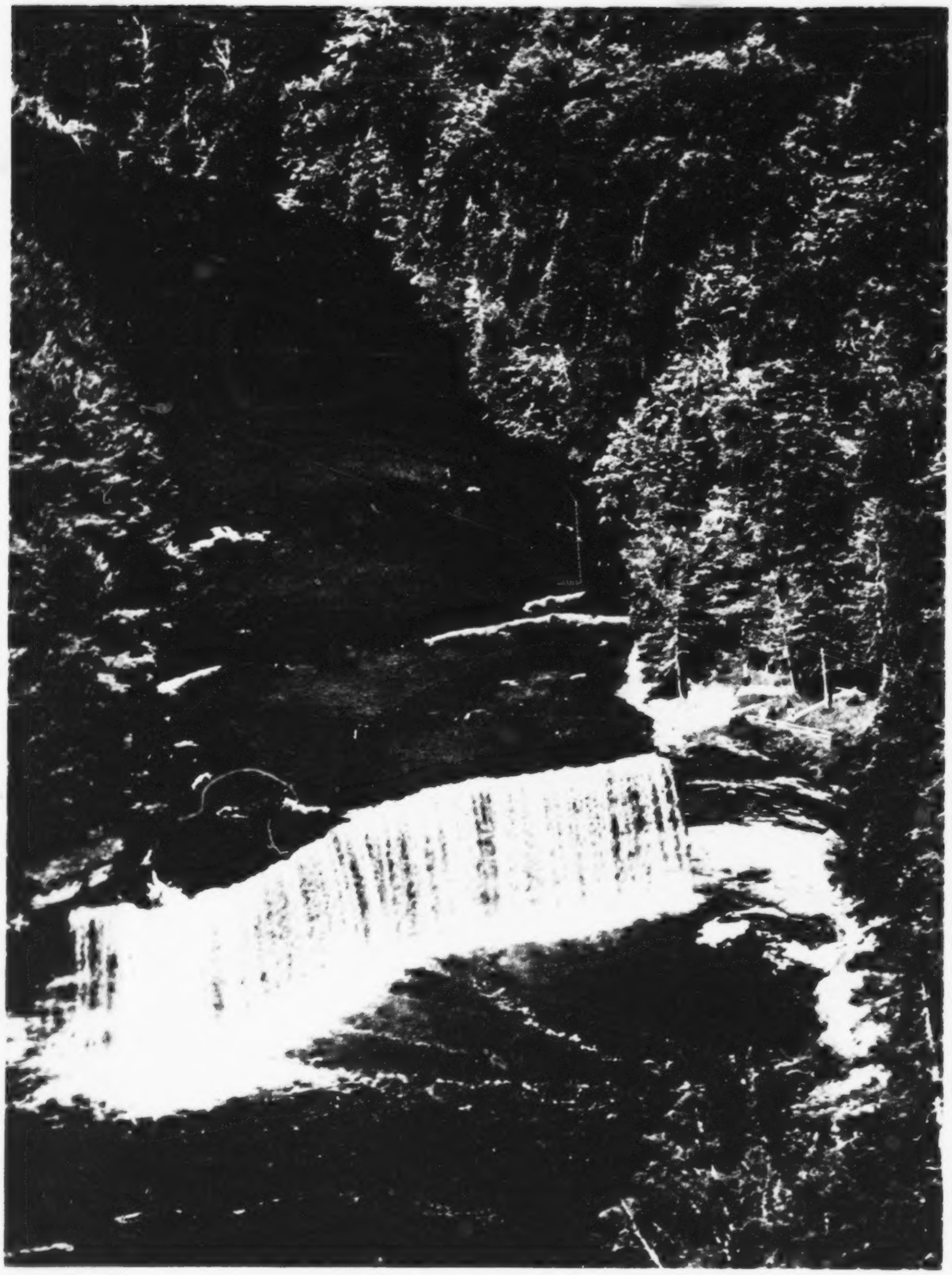
Zone 1 - Although it is an especially narrow watershed, the Eastern South Shore Zone offers natural features which are capable of drawing tourists from considerable distances. Much of the total land and water acreage is in public ownership. Tahquamenon Falls, the Sault Ste. Marie area, and the recently established Pictured Rocks National Lakeshore carry a great amount of appeal for recreationists visiting this zone.

Lakes and streams with adequate access are found throughout the zone. A total of 21 campgrounds are scattered throughout the Hiawatha National Forest and various state forests (See Appendix C). Not as suitable for winter sports activities as the Western South Shore Zone, this zone does, nevertheless, possess four ski resort areas. With the exception of private campgrounds, restaurants, and lodging facilities, this zone has very little private development, primarily due to the short tourist season.

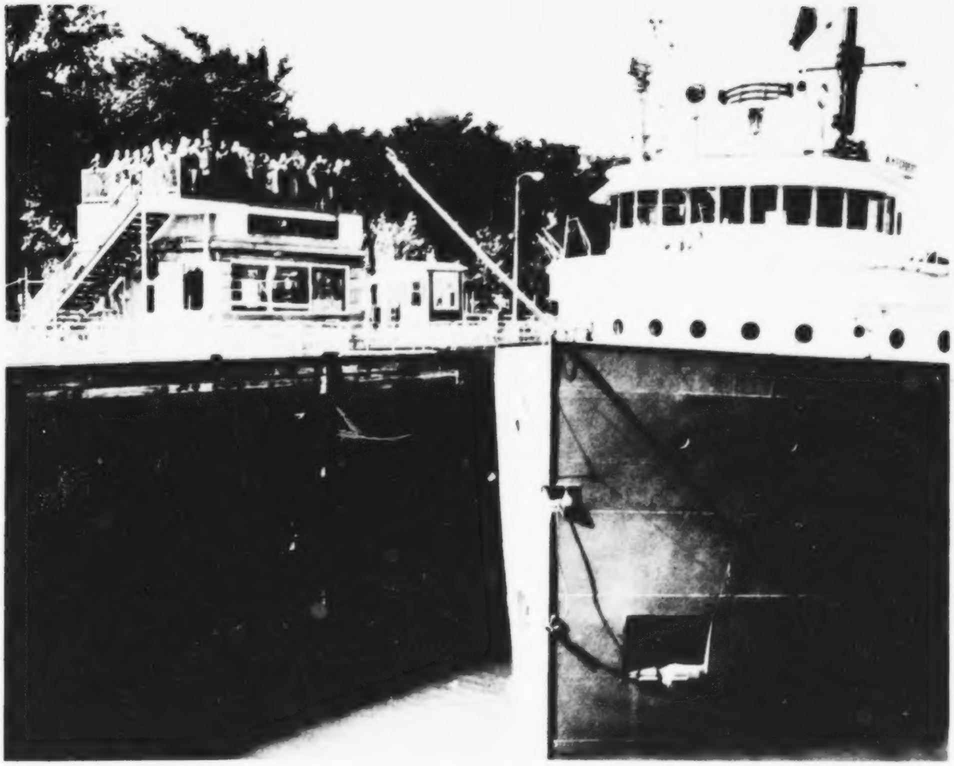
Generally, swimming is greatly limited by the cold water of Lake Superior and the lack of developed beaches on inland lakes. However, the attractive white sand beaches of Whitefish Bay are among the most widely used beaches in the entire basin. Hunting and fishing are especially popular in the vicinity of Newberry, Munising, and Marquette, all popular vacation areas. Canoeing on basin streams and rock hunting along the Lake Superior shoreline, especially in the Grand Marais and Marquette areas, are two principal summer and fall activities. Snowmobiling and skiing are pursued during the long winter months. Marquette offers a variety of attractions, including historical sites, large ore docks, a scenic municipal park, and nearby ski areas. In Sault Ste. Marie are located the famous Soo Locks which draw more visitors than any other single attraction in the State of Michigan The scenic quality of Tahquamenon Falls (the second largest falls east of the Mississippi River) makes the Tahquamenon Falls State Park the second most popular attraction in the zone.

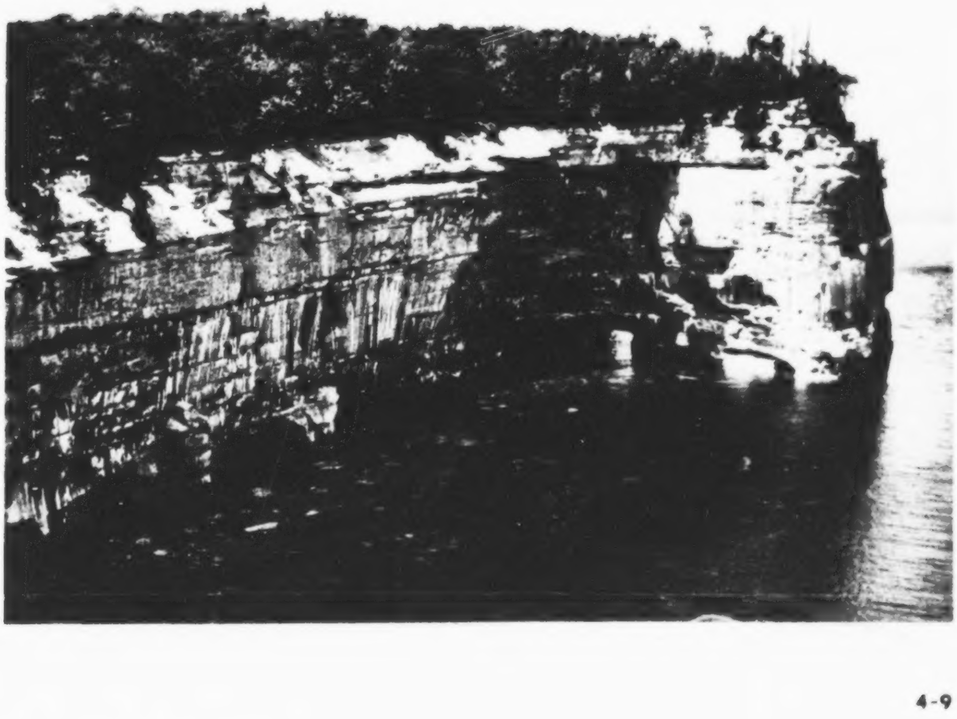
Development of Pictured Rocks National Lakeshore in the Munising-Grand Marais area will attract yachtsmen and sightseers to the zone, and the economic effects of this development could be considerable.

Another significant attraction will result from recent plantings of coho and chinook salmon in several rivers throughout the zone. Although the Lake Superior plantings have not experienced the phenomenal success of the Lake Michigan plantings in terms of growth rate, they will add to the diversity and appeal of the fishery resource. Additional plantings are scheduled for other Lake Superior streams. Despite the relatively small number of fishing charter boats presently in operation along the Lake Superior shoreline, the number has been increasing since the early 1960's (108). Indications



Plates 4-6, 4-7, and 4-8. Three of the basin's more popular destination areas for vacationists and tourists are found in Zone 1. Above: Michigan's Tahquamenon Falls. (Photo by Michigan Department of Natural Resources.) Upper right: The Soo Locks at Sault Ste. Marie. (Photo by Michigan Tourist Council.) Lower right: Pictured Rocks. (Photo by Michigan Department of Natural Resources.)





are that the introduction of salmon and a gradual build-up of lake trout are likely to further increase the demand for charter fishing.

Zone 2 - Zone 2 includes thousands of acres of undeveloped scenic resources that are found in both Michigan's Upper Peninsula and northern Wisconsin. Largest of the three zones, the West South Shore Zone offers the greatest contrast in physical appearance and probably offers the greatest variety of existing and potential recreation areas.

The West South Shore Zone possesses many fast-flowing streams, numerous waterfalls, and a large number of inland lakes, especially in the south central area of Gogebic (Michigan) and Vilas (Wisconsin) Counties. Outstanding scenic qualities exist along Lake Superior's many miles of irregular coastlines. Of the three zones, this zone may possess the greatest potential for additional recreational development. Nearly two million acres are in public ownership, most of which are contained in the Ottawa and Chequamegan National Forests and the Baraga State Forest (See Table A-2).

Plate 4-9. Sylvania was dedicated as a federal recreation area in 1967.
(Photo by the U. S. Forest Service.)

Plates 4-10 and 4-11. Two recreation areas found in Zone 2 that possess exceptional natural qualities. Top Photo: Isle Royale National Park. Bottom Photo: Porcupine Mountains State Park. (Photos by Michigan Tourist Council.)

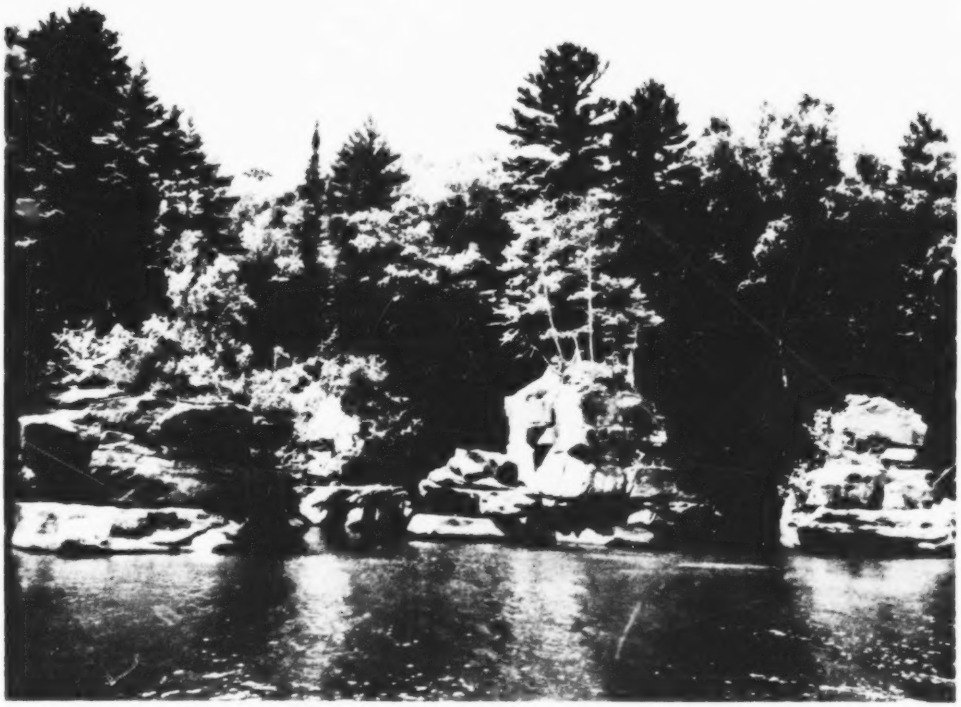


Plate 4-12. The Apostle Islands and associated mainland are being considered for establishment as a national lakeshore. (Photo by Wisconsin Department of Natural Resources.)

At the eastern end of the zone lies the well-known and popular, scenic "copper country" of the northern portion of Michigan's Keweenaw Peninsula. This is also a jumping-off-point to Isle Royale National Park. Further to the west lies Porcupine Mountains State Park, the largest and most popular of Michigan's Upper Peninsula parks. In the south central lake-dotted portion of the zone lies Sylvania, the 29 square mile lake and forest complex recently acquired and presently being developed for recreational use by the U. S. Forest Service. The western Wisconsin portion of the zone offers the famed Apostle Islands -- comprising more than 48,000 acres of sand, forest, and unique rock formations -- and the ecologically interesting environment of the Kakagon and Bad River sloughs.

Whereas the above mentioned resource areas merit special recognition, the remaining water and forest-rich environment offers additional water-oriented outdoor recreational opportunities. There are several streams designated as canoe trails. A large number of scenic waterfalls are found throughout the zone. Rock hunting is an extremely popular pastime for the beachcomber, notably along the Keweenaw Peninsula shoreline and the Apostle Islands area. Participation by basin residents and tourists in winter sports is substantial during the winter season. Of the 19 ski resort areas in the study area, nine exist within this zone. The zone has 32 of the 78 federal and state forest campgrounds in the Lake Superior study area (See Appendix C). A number of scenic rest stops, some offering excellent picnic sites, exist along main highways throughout the zone.

Also included in the West South Shore Zone is Isle Royale National Park, remotely located some 48 miles to the northwest of the Keweenaw Peninsula in Lake Superior. Isle Royale is a primitive type area having a relatively low annual visitation and offering a unique experience seldom found in any other place. The area features primitive camping, hiking trails, many miles of canoeable waters, excellent trout and pike fishing, and two lodges located at opposite ends of the island for the convenience of the less hardy. A very interesting phenomenon to visitors is the moose and wolf populations which have maintained a favorable ecological balance since the firm establishment of the wolf in 1948.

Fishing for coho and chinook salmon and lake trout, if the numbers of the latter continue to increase, should become popular pastimes in the Lake Superior waters of Zone 2. Similar to the situation in Zone 1, attention may also need to be given to existing harbors of refuge in Zone 2 to accommodate possible increased boating in Lake Superior.

Zone 3 - The North Shore Zone is the second largest of the three Lake Superior zones. With the exception of the relatively heavily populated Duluth-Superior SMSA, it is more sparsely populated than the other zones. It contains 1.6 million acres of publically owned forest land, nearly half of which is found in the Superior National Forest (See Table A-2). Of the three zones, it possesses the largest number of inland lakes, many of which are found on public lands.

The zone has few primary roads, limiting access to the area. With the exception of the area around Duluth and along the North Shore highway, recreation development in Zone 3 has occurred to a lesser extent than in the other two. Tourists and vacationists probably do not remain in this zone for as long a period of time as they do in Zones 1 and 2. A major reason for this is the absence of any prominent destination area such as the Tahquamenon Falls and Pictured Rocks National Lakeshore in Zone 1 and the "copper country" of Michigan's Keweenaw Peninsula and the Porcupine Mountains State Park in Zone 2. Many persons utilize the North Shore Drive, one of the zone's more popular attractions, either to drive to the Boundary Waters Canoe Area or to continue on the Lake Superior Great Circle Route.

This highway runs the entire length of the shoreline from Duluth to the top of the Arrowhead in extreme northeast Minnesota. Along the length of this scenic highway are located a number of state parks and scenic, wayside parking areas. During the summer vacation months the drive is utilized primarily by sightseers, campers, fishermen, and picnickers. Fishermen bound for Canada and the Boundary Waters Canoe Area probably generate the major portion of traffic in the spring and fall. At the extreme end of Cook County lies Grand Portage National Monument. In addition to having historical significance, it also serves as a gateway to Isle Royale National Park. Within the state forests and the Superior National Forest are found a considerable number of campgrounds situated near lakes or streams.

Charter boat fishing operations are not large in number, primarily because of the rugged shoreline and a scarcity of harbors of refuge. Sightseeing, inland lake fishing, and camping are the principal summertime pursuits. Hunting and sightseeing are the primary activities in the fall; while skiing, snowmobiling, and ice fishing are main pursuits through the winter months.

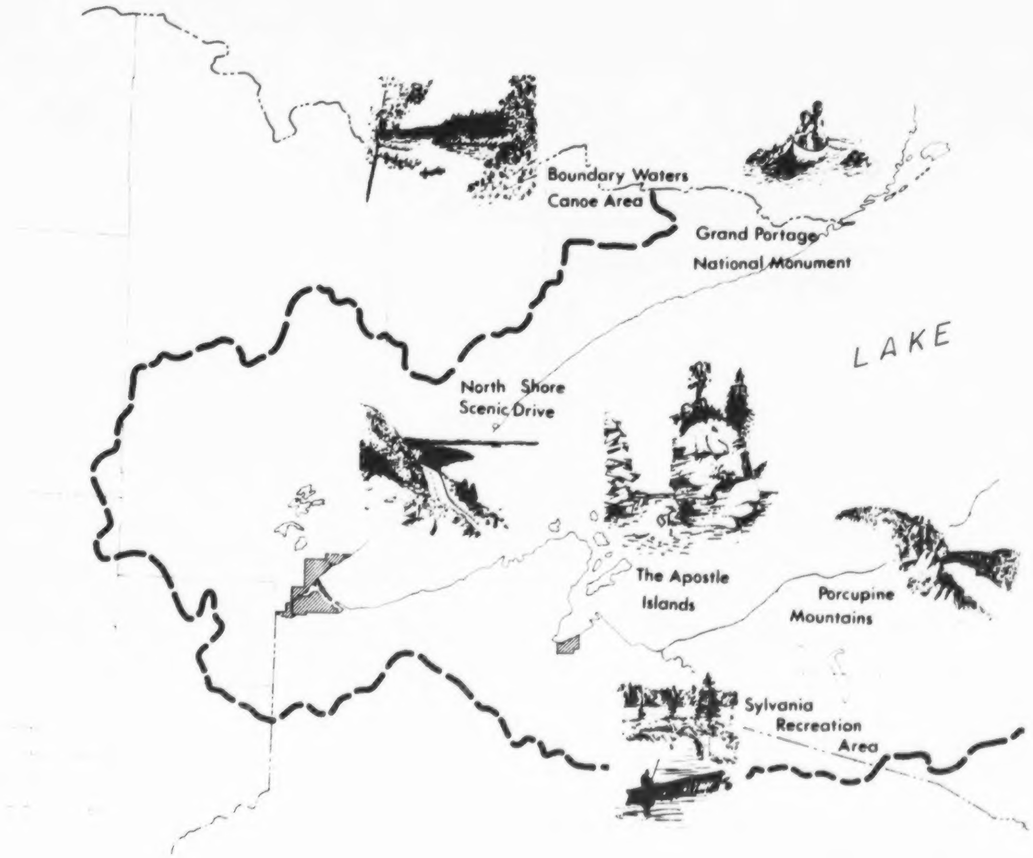
The northwestern reaches of the North Shore Zone boundary runs through a portion of the remote and famed Boundary Waters Canoe Area. Approximately 5 to 10 percent of the 873,000 acres that make up this abundantly endowed forest and water environment lie within the Lake Superior Basin (29, 30). Although generally pictured by many as a true wilderness, the Boundary Waters Canoe Area is essentially a semi-wilderness area where timber harvesting and wilderness recreation are combined. Nearly all visitors to the Boundary Waters Canoe Area go there to canoe and/or fish on its 2,000 named lakes and hundreds of miles of streams. An estimated 112,800 people visited the Boundary Waters Canoe Area in 1968. The availability of more than 60 widely scattered access points has made a determination of visitation difficult (29, 30).

The zone possesses many good trout streams (183 streams totaling 950 miles) (28). With few exceptions, these streams are unsuitable for canoeing due to their small size and the presence of numerous rapids and waterfalls. They do, however, pro-

Plates 4-13 and 4-14. Scenes that are familiar to visitors of the North Shore Zone of the Lake Superior Basin.

Above: The Boundary Waters Canoe Area. (Photo by the U. S. Forest Service.)

Right: Minnesota's North Shore on Lake Superior. (Photo by Minnesota Department of Economic Development.)



vide an excellent source of scenic pleasure to users of the North Shore Drive. The Duluth-Superior Bay area is one of the few locations within the entire study area where pleasure boating occurs to any significant degree.

RECREATION ACTIVITIES

The vast majority of recreation activities are centered around or near water. These include boating, fishing, and those activities significantly enhanced by the presence of water such as hiking, camping, sightseeing, and driving for pleasure.

The following discussion is concerned with the basin's capacity to satisfy demand for various vacation opportunities with special emphasis on water-oriented activities.

Water Dependent Activities.

Swimming - In many areas of the nation swimming is the most participated in of water dependent activities. However, in the Lake Superior Basin, a short sum-

mer season, cold water temperatures, and cool air temperatures tend to restrict the participation in swimming, especially in the waters of Lake Superior. The shallower waters of certain Lake Superior Bays tend to warm faster and stay warm for longer periods of time than the waters in the main part of the lake and do, on occasion, provide temperatures which allow relatively comfortable swimming. However, water temperatures at these areas are greatly affected by wind direction and the presence of sunshine and are susceptible to rapid change.

Although large numbers of inland lakes exist within the basin, lack of beach development and good access limit the potential of many for swimming. Cold water and cool air temperatures are also factors which discourage swimming in these inland lakes. Approximately 30 percent of the public recreation areas in the Lake Superior Basin provide swimming facilities (See Appendix C). Despite these limitations, swimming does occur at some county and state parks located on inland lakes and state parks adjacent to Lake Superior. Several resorts, associated with Lake Gogebic, Michigan's largest upper peninsula lake, provide the visitor with an opportunity to swim, water-ski, and sail.

Although swimming is generally considered to be actual immersion of a person's body in the water, much of what is considered swimming activity merely involves occasional dabbling or wading, with most of the actual time spent either in beachcombing or in sunbathing. These facts, in conjunction with the outstanding scenic qualities and miles of privately-owned but accessible beaches, should be recognized when considering shoreline uses. A survey conducted by the Bureau of Outdoor Recreation, indicated that only 25 miles of publicly-owned beach are available along the shores of Lake Superior.

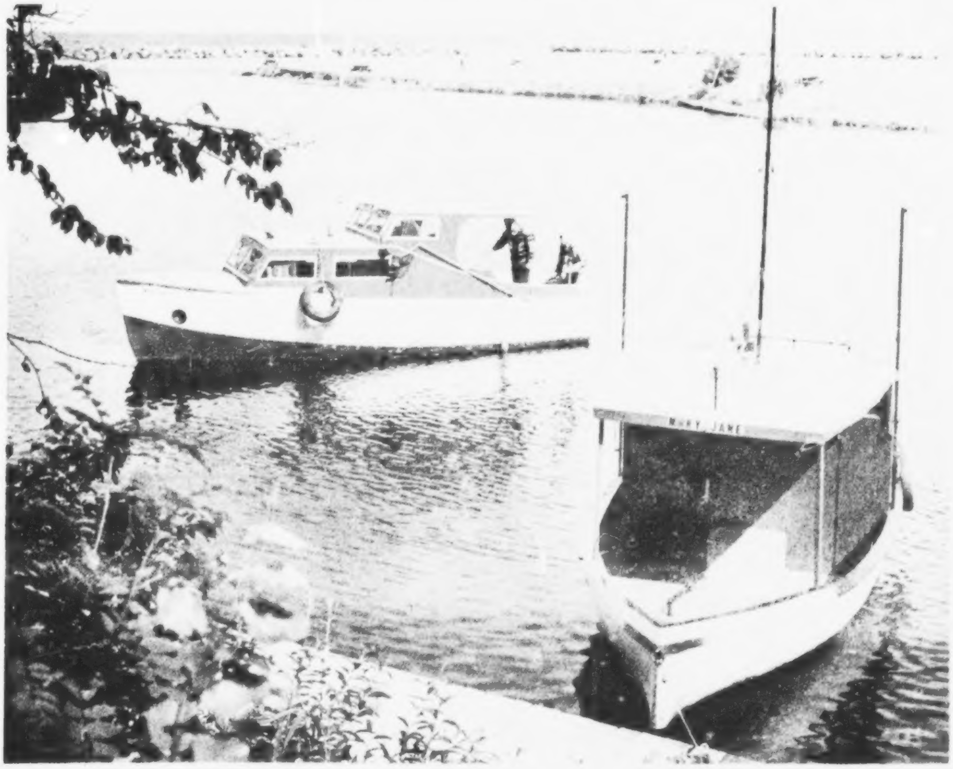
Plate 4-16. Despite cold water temperatures, occasionally some bay areas of Lake Superior do warm enough to allow relatively comfortable swimming. Basin inland lakes and ponds offer warmer temperatures. (Photo by Michigan Department of Natural Resources.)

Boating - At the present time, powerboating, sail boating, and canoeing occur only to a limited extent in the basin, with participation in the latter more extensive than in the others. Considering its remoteness, the relatively few lakeside residents, and the abbreviated boating season, the current numbers of recreational craft using Lake Superior waters is probably quite low. However, the total number of water craft using basin waters is difficult to determine. Basin residents have access to waters outside the basin while certain nonresident enthusiasts satisfy their boating desires on Lake Superior and its tributary waters.

Powerboating - The operation of smaller motor driven boats is limited to readily accessible inland lakes and protected bays of Lake Superior. Inland lakes such as Au Train Lake and Lake Independence in Zone 1, Lake Gogebic and Giles Flowage in Zone 2, and several lakes and larger reservoirs near Duluth in Zone 3, support considerable boating use by fishermen, water-skiers, and those merely boating for pleasure. In Lake Superior, the operation of smaller boats occurs primarily at the following locations: Duluth-Superior Bay, the Chequamegon Bay area, the waters around the Apostle Islands, the Sault Ste. Marie area, and Munising Bay.

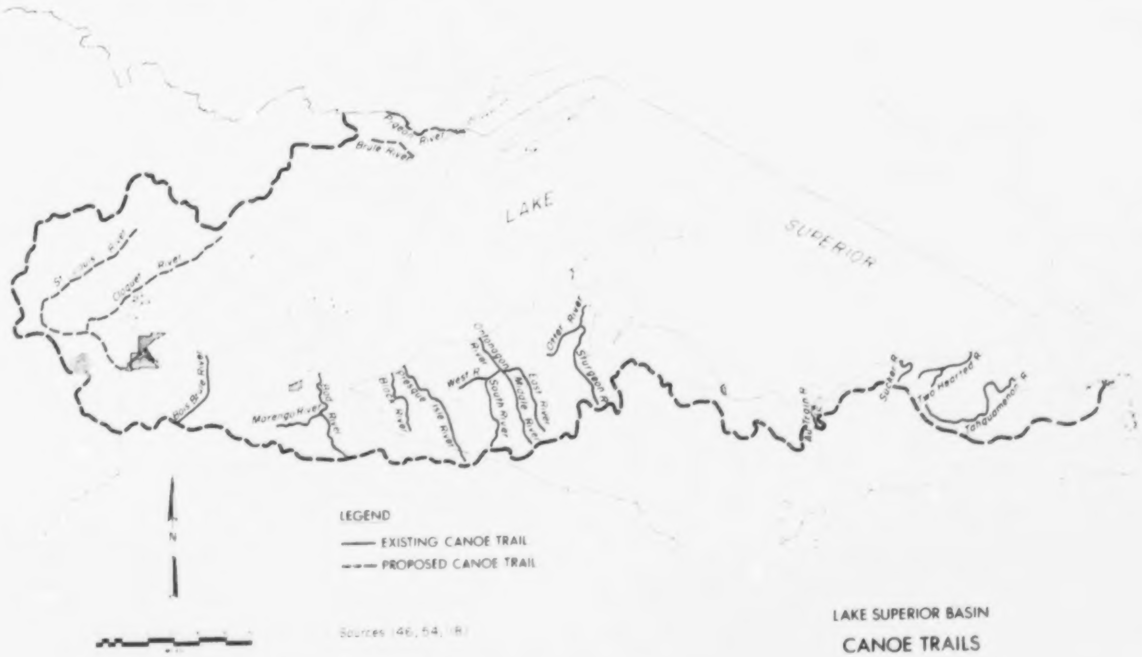
Larger pleasure boats and yachts also cruise the above mentioned Lake Superior Bay areas. Some will, on occasion, brave the open waters of Lake Superior proper. However, the rough waters, dangerous fogs, and scarcity of protected harbors tend to throttle the enthusiasm of even the most intrepid yachtsmen. The larger water craft are utilized by charter fishermen and the more wealthy residents residing in basin municipal areas. A few of the larger yachts enter Lake Superior through the Soo Locks.

Plate 4-17. Charter boats at the mouth of the Black River in Michigan's Gogebic County. With the introduction of the coho and chinook salmon into Lake Superior waters and establishment of the Pictured Rocks National Lakeshore, charter service operations have a good chance of increasing in the basin. (Photo by Michigan Tourist Council.)



If the stocking of coho and chinook salmon and rehabilitation of the lake trout continue to be successful, increased numbers of charter and large sport fishing boats can be expected on basin waters in the future.

Canoeing - The Lake Superior Basin contains approximately 950 miles of existing and proposed canoe trails (See Plate 4-18 and Table A-4). Most of these canoe trails are situated in wilderness settings. They range in character from such fast white water streams as the Black and Presque Isle Rivers located in Zone 2 to the slow meandering waters of the Au Train River in Zone 1 and the St. Louis River in Zone 3. Within Zones 1 and 2 the State of Michigan has designated a total of eight streams as canoe trails. Zone 3 has four proposed or potential canoe trails. These are the St. Louis, Cloquet, Boise Brule, and Pigeon Rivers. The provision of additional wilderness campsites, portages, and access sites would make available to the recreationist the scenic qualities which exist on many basin streams. The St. Louis River is a scenic and undeveloped river located near the Duluth metropolitan area. This river, gentle for much of its length, is especially appreciated by canoeing families.

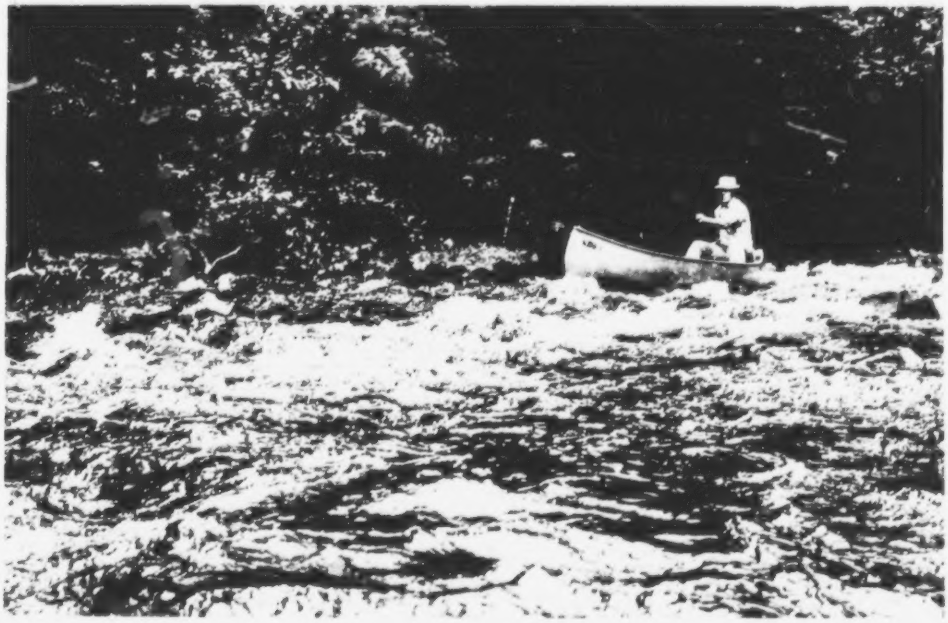


Sources (46, 54, 18)

LAKE SUPERIOR BASIN

CANOE TRAILS

PLATE 4-18



Plates 4-19 and 4-20. Within the Lake Superior Basin are found a number of streams exhibiting a variety of interesting and scenic natural characteristics. (Upper photo by Wisconsin Department of Natural Resources. Lower photo by Michigan Department of Natural Resources.)

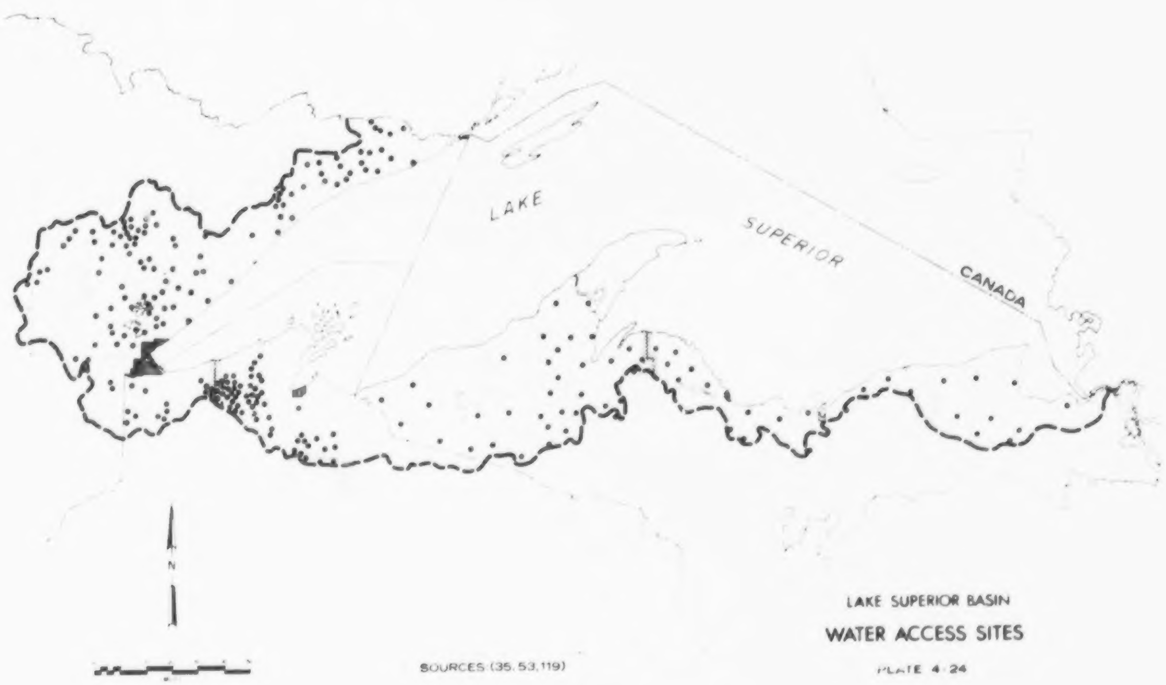
Plate 4-21. Sailing, like most pleasure boating, is restricted to bays and other protected areas by the roughness and unpredictable nature of Lake Superior's waters. (Photo by Michigan Department of Natural Resources.)

Sailing - Sailing in Lake Superior is primarily limited to basin inland lakes and to protected bay areas such as the Duluth-Superior Bay, Keweenaw Bay, the waters around the Apostle Islands, and other small bays and inlets. Very little sailing takes place throughout the rest of the Lake Superior Basin mainly because of the lack of adequate harbor facilities, cold temperatures, inclement weather, and the steep rocky shoreline. Fog is also a problem and occurs on Lake Superior more frequently than on the other Great Lakes. Lake Superior is not the yachtsman's mecca. The majority of venturesome men who have cruised there have had the same criticisms--"too cold," "too far," and "not enough harbors." Despite such adverse natural conditions, for those willing to brave her waters Lake Superior offers varied cruising amid dramatic settings unmatched elsewhere (67).

Fishing - In all probability, fishing is the number one water-dependent activity in the basin. the Sport fishery is widespread and diversified. Commonly found sport fishes are walleyed pike; yellow perch; bluegill; northern pike; rainbow, brook, brown, and lake trout; largemouth and smallmouth bass; muskellunge; and, more recently, coho and chinook salmon. Not only are many different species of fish found to test the angler's skill, but the basin also provides ample sport for the fisherman on a year-round basis. Ice fishing is indulged in by a considerable number of basin residents and visitors during the winter months.

Access to basin lakes and streams is especially important to fishermen as it is to canoeists and other boating enthusiasts. Water access sites are provided by federal and state agencies and private interests. The States of Michigan, Minnesota, and Wisconsin have developed approximately 250 water access sites in the basin (See Plate 4-24). There are many lakes, however, having either no access or only very

Plate 4-22. The Lake Superior Basin provides a wide variety of fishing. (Top photo by Michigan Tourist Council, other photos courtesy of Duluth Herald.)



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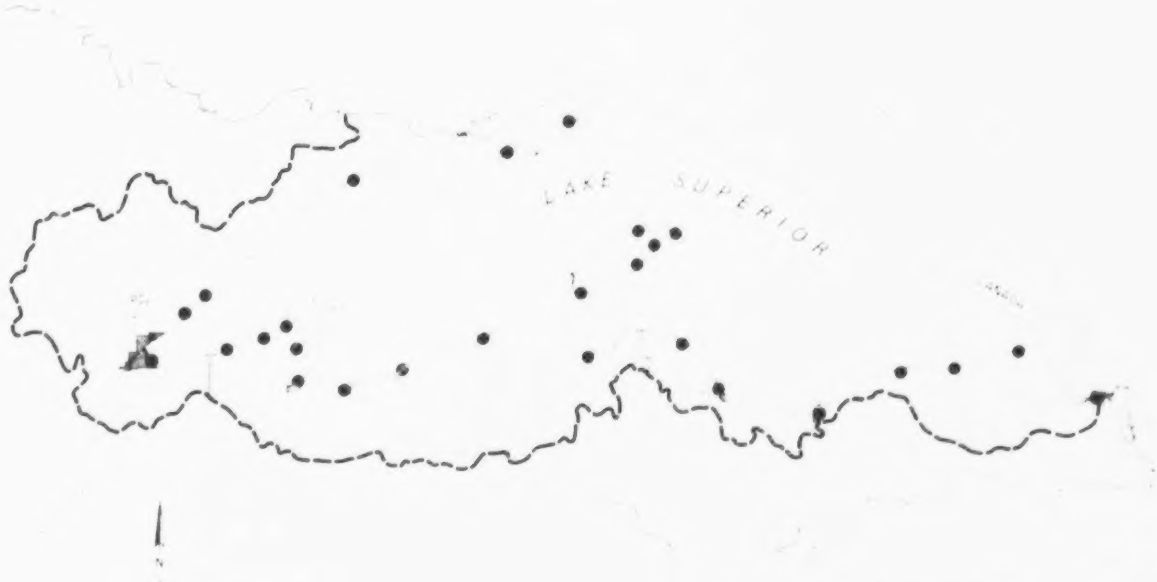
LAKE SUPERIOR BASIN

WATER ACCESS SITES

PLATE 4-24



LAKE SUPERIOR BASIN

HARBORS OF REFUGE

PLATE 4-23

limited access. The increased use of snowmobiles will make many lakes which were once difficult to reach more readily accessible during the winter season.

An example of the wide variety of fishing available to the basin recreationist during different times of the year is found in the Apostle Islands area. Within a few miles an angler can fish for lake trout, brook trout, rainbow trout, and brown trout among the islands and along the mainland shore; troll or cast for "walleyes," smallmouth bass, and northern pike in the mainland slough; seine for smelt in streams along Chequamegon Bay in the spring; and fish through the ice for perch in the winter. Spawning rainbow trout and brown trout migrate from Lake Superior into basin streams and provide a significant sport fishery during the spring. At about the same time, several basin rivers support large runs of smelt.

The stocking of coho and chinook salmon in certain Lake Superior streams and the restoration of the lake trout are increasing the angler's interest in these fish, which may prove to be a significant future attraction to basin visitors. In the early 1960's only nine charter boat operations remained along the Lake Superior shoreline. However, it is now estimated that 50 such operations are available for charter service (108).

Water-Enhanced Activities.

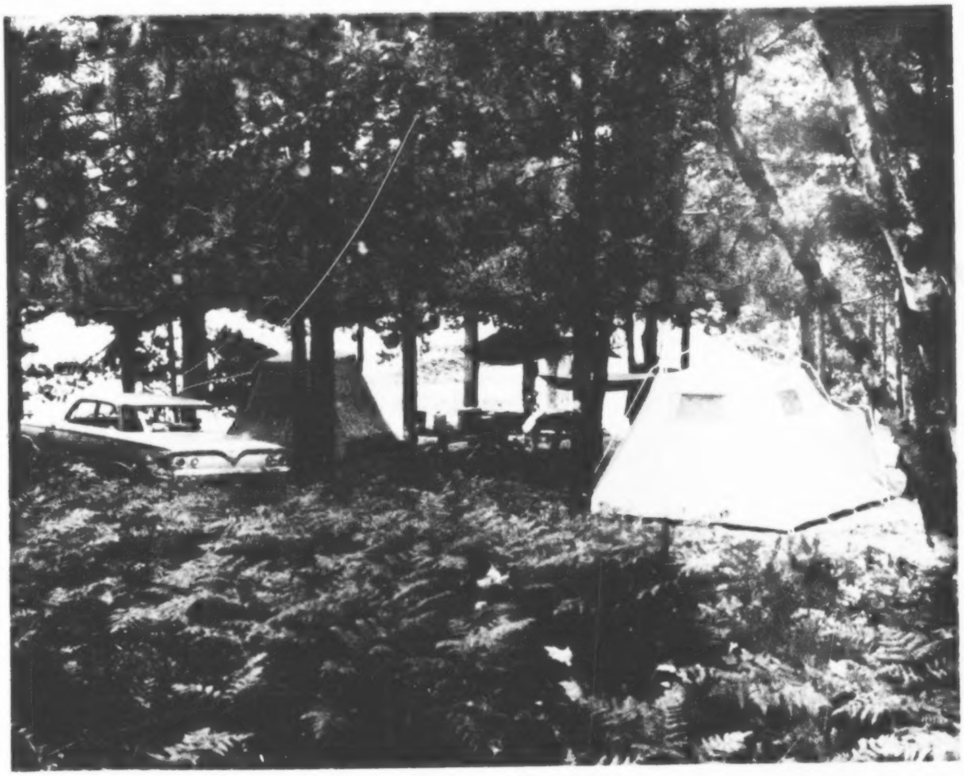
Picnicking - "Outdoor Recreation for America" stated that picnicking is the most preferred activity for a day's outing. Perhaps it is popular because it involves little expense other than travel costs and requires a minimum of equipment. All age groups can easily participate, and it is readily adaptable to family groups. Facilities for this activity are provided at most of the developed public recreation areas of the basin. Picnicking is participated in along much of the Lake Superior shoreline. Since picnicking is principally a day-use activity, it is important that adequate facilities be provided at desirable locations near municipal areas and along principal tourist routes. Recreation areas either along or near Minnesota's North Shore, especially in the vicinity of Duluth-Superior, experience heavy use (much of it picnicking activity) during the summer months. These include Gooseberry Falls State Park, Jay Cooke State Park and a number of scenic rest stops spaced along the North Shore Drive.

Camping - Nationally, camping participation is increasing at a rapid rate, second only to water-skiing. This growth can be principally attributed to: (a) the desire of

Americans to travel as fast, as far, and as cheaply as possible for vacations and weekend outings; (b) innovations in camping gear and equipment and in the automotive industry; and (c) well-developed campgrounds. The popularity of camping is strongly exhibited by the considerable number of campers utilizing basin campgrounds during the summer months.

The majority of campers today are seeking the home-away-from-home type of environment--namely, campgrounds offering modern wash and shower rooms, concession stands or necessary grocery stores, electrical hook-ups, and sewage stations to facilitate use of self-contained house trailers. Providing and maintaining this type of facility is expensive, and it comprises a major portion of the managing agencies' development and operation cost. The more popular state parks in the Lake Superior Basin are equipped with modern facilities, while many smaller ones provide less convenient facilities.

Plate 4-25. Unlike most basin state parks, state and national forest campgrounds offer no modern facilities but are situated in a secluded area with scenic surroundings. (Photo by Michigan Department of Natural Resources.)



Remotely placed campgrounds are found on the national forest and state forest lands. These sites are usually situated in a scenic spot near a stream or lake some distance from the main highway and provide only the bare necessities such as a water well or pump and pit toilets. Approximately 60 campgrounds have been developed in the Hiawatha, Ottawa, Chequamegon, and Superior National Forests. Numerous campgrounds are scattered throughout state forest areas and are similar to the national forest campgrounds in location and layout.

Although the heavy use pressure that is prevalent in the southern portions of the three basin states does not exist within the Lake Superior Basin, some of the more popular camping areas such as Porcupine Mountains and Tahquamenon Falls State Park in Michigan, Gooseberry Falls State Park in Minnesota, and Pattison State Park in Wisconsin receive large numbers of campers during the July and August vacation periods.

The increasing popularity of camping, especially of the modern camper-trailer and house trailer type, combined with an increase in tourist visitation, will undoubtedly create a need for additional camping areas (particularly those having the modern, convenient type facilities) in the Lake Superior Basin. Despite the trend to modern camping, a number of persons still prefer and seek out the more primitive type camping areas. It will be necessary for federal, state, and private resource managing agencies to provide adequate areas for this segment of the camping public*.

Sightseeing - The extreme popularity of sightseeing in the Lake Superior region can be attributed to the presence of exceptional scenic features. In addition to many miles of spectacular Lake Superior shoreline, the basin has many streams containing numerous waterfalls and rapids, several small mountain ranges, vast tracts of wilderness type areas, and large numbers of islands along the south shore of Lake Superior. Other features that exhibit a high degree of natural beauty in various combinations are inland lakes, rock outcroppings, bluff escarpments, sand dunes, valleys, river gorges, forests, marshes, swales, and sloughs. There are many worthwhile scenic features not reachable by main highways and not a part of developed recreation areas. Many of these scenic features are unknown to basin visitors.

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* A survey conducted by the North Central Forest Experiment Station, St. Paul, Minnesota, in 1967 concluded that most people camping on national forest land do not seek out or prefer facilities such as showers, electrical hook-ups, concession stands, or other similar conveniences: rather, they prefer privacy and a primitive setting.

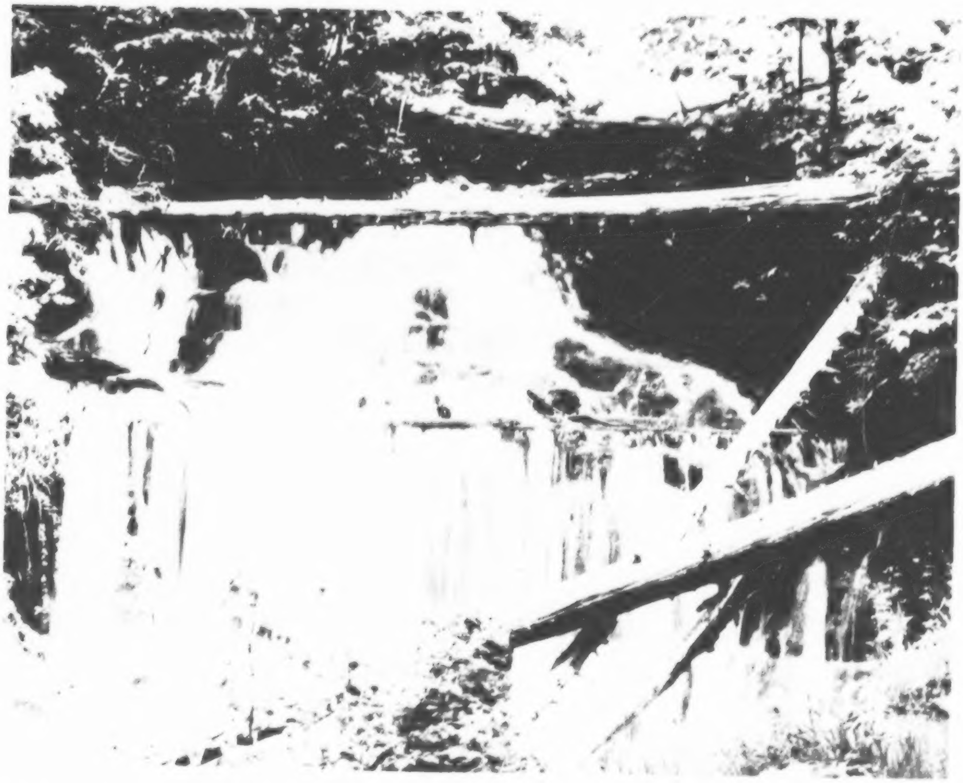
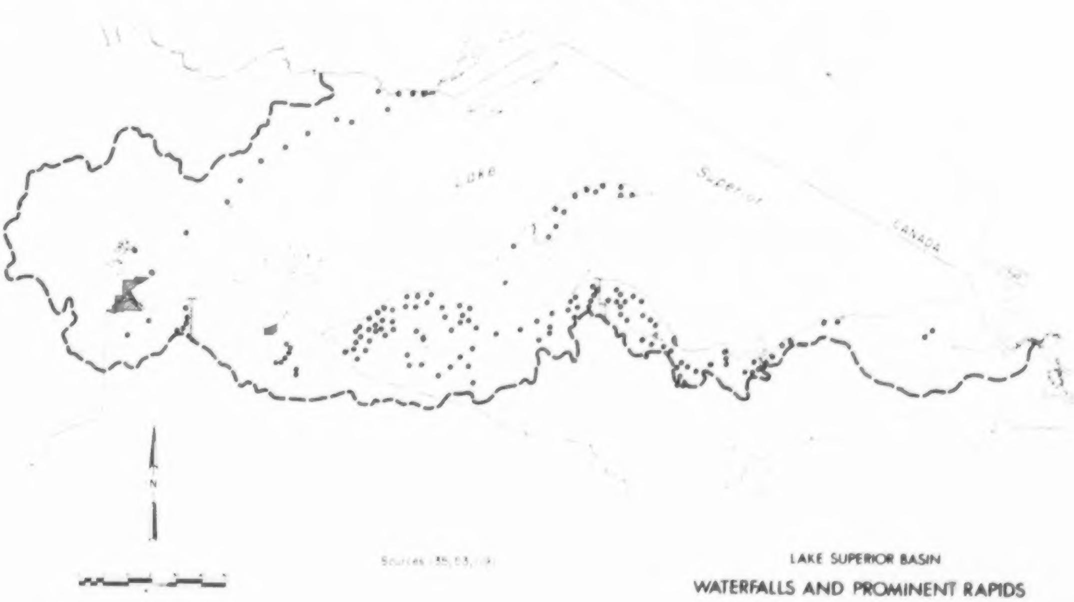


Plate 4-26. Wagner Falls near Munisina. Visitors are attracted to the large variety of scenic waterfalls found throughout the Lake Superior Basin. (Photo by Michigan Tourist Council.)



Sources (35, 53, [illegible])

LAKE SUPERIOR BASIN

WATERFALLS AND PROMINENT RAPIDS

PLATE 4-27

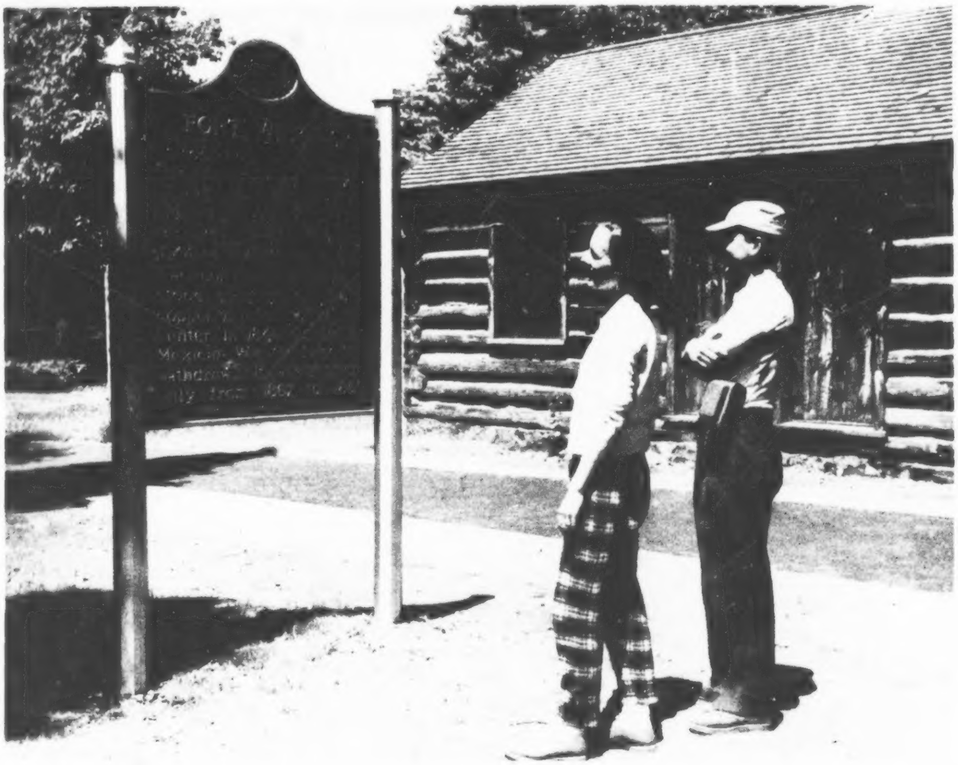


Plate 4-28. At Fort Wilkins State Park in Michigan's Keweenaw Peninsula (one of a number of places in the Lake Superior region with an interesting history) the past has been re-created and interpreted for the visiting public. (Photo by Michigan Tourist Council.)

Several travel rest areas in the Michigan portion of the Lake Superior Basin provide the traveler with a place to refresh and picnic and also serve as centers of information concerning areas to visit and things to see and do while in the state. For the interested traveler, the State of Minnesota has provided a number of wayside parks along the North Shore Drive which offer scenic views of Lake Superior and its shoreline.

Associated with the existing natural resources are several large and well-known primitive-type state parks, one established and one proposed national lakeshore, both national and state historical sites, the scenic Keweenaw Peninsula, the well-known Soo Locks, a unique national park, and a national monument. The above mentioned locations are the real tourist destination areas and have been discussed in other portions of this report (See Plate 4-15).

Scenic highways are found at various locations in the basin, both along the Lake Superior shoreline and inland. The scenic Great Circle Drive which circumscribes Lake Superior borders on the lake for nearly the entire length of Zone 3. During the months of September and October, the brilliant hues of autumn create a special attraction for the outdoor recreationist. Areas of special beauty have been recognized through the designation of certain roads as fall color tour routes. Many Wisconsin counties designate, mark, and publicize colorama tours, including some roadways in the basin. Nearly 700 miles of such routes have been designated by the Michigan Department of Natural Resources within the Michigan portion of the Lake Superior Basin (34).

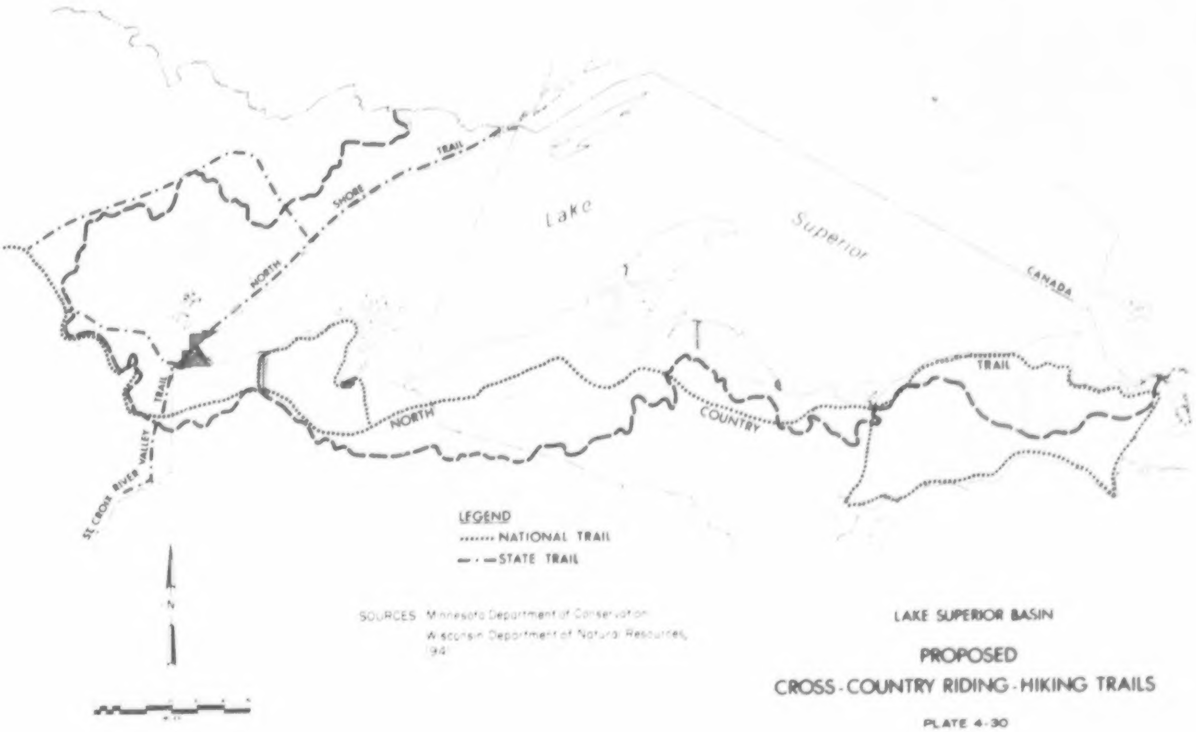
Although recreationists participate in all the other basic activities in addition to sightseeing, it is the attraction of this latter activity which initially draws many recreationists to the basin.

Nature Interpretation - Accompanying the popular growth in outdoor recreation is an accelerated interest in nature. Federal, state, and local agencies have developed interpretive programs at a number of recreation areas. With the added understanding gained through these programs, people are more able to enjoy the outdoors. Knowledge of nature is often incorporated into other activities, an example being the hiker who adds to his day's experience by attempting to identify native flora and fauna. For some individuals, nature study has developed into a separate activity by itself. Areas of concentration include identification, function, and ecological interrelationships. Students of nature, ornithologists for example, differ from sightseers in that their interest goes deeper than visual pleasure. The object of study may be recognized as a thing of beauty, but its functional characteristics are also appreciated. The Lake Superior Basin contains a wide variety of plants and animals arranged

Plate 4-29. Nature study can be useful as a learning process or enjoyed strictly for its esthetic values. (Photo by Michigan Department of Natural Resources.)

in several ecosystems. The presence of a variety of wildlife forms including the moose, white-tailed deer, wolf, coyote, fox, mink, muskrat, weasel, pine marten, beaver, fisher, otter, and many varieties of waterfowl and songbirds provide an esthetic attraction for those who wish to study their habits. Other persons merely appreciate the presence of such wildlife. In addition to the fisherman, the upstream migration of coho and chinook salmon attracts highly interested onlookers. Bogs, swamps, sand dunes, oligotrophic and eutrophic waters, and a number of forest types comprise some of the major ecological communities. Isle Royale is a truly unique area providing both the scientific and casual observer of nature an unusual opportunity to observe an environment which is nearly free of man's influence. Additional interpretive programs to better portray the basin's great wealth of natural resources would seem appropriate.

Hiking - A scenic trails bill has been enacted to authorize development of a system of scenic trails throughout the nation. One proposed route is the North Country Trail which will originate near the Appalachian Trail in Vermont and wind



SOURCES: Minnesota Department of Conservation
Wisconsin Department of Natural Resources, 1971

LAKE SUPERIOR BASIN
PROPOSED
CROSS-COUNTRY RIDING-HIKING TRAILS
PLATE 4-30

approximately 3,000 miles westward to the Lewis and Clark Trail in North Dakota. A large segment of this trail will pass through the Lake Superior Basin. The U.S. Forest Service and the State of Wisconsin have constructed portions of a trail which extends along the proposed route of the North Country Trail. The completed portions of this trail have already been placed in use for the public. Trails can be constructed so as to pass through locations of historical significance as well as areas of scenic beauty. The significance of hiking trails to outdoorsmen is well summarized in the following excerpt from the publication, Trails for America: "Trails will carve through areas both near to, and far from, man and his works and will provide many varied and memorable experiences for all who utilize them (94)."

Hiking trails exist in many of the basin's state parks. In addition, old railroad beds and logging roads running through federal, state, and county forests provide many miles of suitable hiking. The Greenstone Ridge Trail, extending for nearly the entire length of Isle Royale, is a very well known hiking trail to persons visiting that island.

Hunting - Hunting in the Lake Superior Basin occurs primarily in the fall and winter months on extensive stretches of publicly owned lands. These public lands include state and federal game management areas, reforestation areas, wetlands, and multiple-use forest lands. Considerable acreages of privately owned lands are found within the national and state forest boundaries. The majority of this land is owned and administered by large wood-using and mining companies which maintain a policy that allows hunting by the public.

The plentiful supply of available public and private lands that contain an abundance of game and fur bearers make hunting (and trapping) important pastimes for many basin residents, particularly for those persons having little employment through the winter months.

Hunting for white-tailed deer is an important economic and social winter event in many small northern communities. Quiet and subdued for most of the year, these communities and their small businesses bustle with activity during the hunting months of November and December. Large numbers of red-clad hunters, most of them from cities far to the south, seem to literally overrun the towns. Black bear are also sought, and while moose are not uncommon in Zone 3, there is no open season on them at present. Popular small game animals include ruffed grouse, spruce grouse, woodcock, varying hares, grey squirrels, and a variety of waterfowl. Present only in extremely limited numbers is the timber wolf, presently classified as an endangered species.

Plate 4-31. The ruffed grouse is the basin's most common upland game bird and the one most eagerly sought by hunters. (Photo by Michigan Department of Natural Resources.)

Plate 4-32. Blueberry picking is becoming an increasingly popular pastime in the Upper Great Lakes region. (Photo by Michigan Department of Natural Resources.)

Mushroom and Blueberry Picking - Two other favorite activities of basin residents and vacationists are the search for the popular sponge mushroom (morel) in the spring and the picking of blueberries during the late summer period. While the morel is not hunted here to the extent it is in northern lower Michigan, nevertheless it grows well on moist leafy forest floors following warm May rains. The blueberry grows in profusion on open sandy plots among thick stands of jack pine and red pine near the Lake Superior shoreline.

Rock Hunting - This is becoming an increasingly popular outdoor activity throughout the Lake Superior Watershed. The pebbled beach areas,

Plate 4-33. The "rock hound" can find a wide variety of interesting rock types along much of Lake Superior's shoreline. (Photo by Michigan Tourist Council.)

old copper mine sites, and gravel pits offer opportunities for the "rock hound" to seek a wide variety of gem stones, including quartz, epidote, jasper, dolomites, and the highly popular pastel colored agates. Considered to be the more productive locations are the Keweenaw Peninsula, Isle Royale, Marquette, Grand Marais, and Munising areas, as well as much of the North Shore area shoreline. Whereas rock collecting is strictly a hobby for many Lake Superior tourists, it has become a source of income for the local lapidarist and has encouraged the establishment of various rock shops along the main tourist routes.

Winter Sports. The Lake Superior Basin supports winter recreation activities common to the northern temperate climatic zone. Skiing, snowmobiling, ice fishing, ice skating, sledding, ice boating, tobogganing, and hunting are some of the more popular winter activities in the basin.

With a major portion of the basin's economy dependent on recreation, it has become profitable to develop attractions capable of drawing visitors on a year-round basis. Until recent years winter was a period of economic depression for nearly all northern resort communities. An increase in wintertime activity in the form of skiing and snowmobiling is changing this situation in some communities.

Snowmobiling- Snowmobiles have made a significant impact on the outdoor recreation scene in recent years. In the last several years, literally thousands of these over-the-snow machines have shown up on the open market at prices many people can afford. Snowmobiling safaris and races have become highly popular throughout the basin area. The second annual two-day national snowmobiling races were held in Munising in February 1967. Many acres of public land having fire lanes, logging roads, utility roads, and trails normally unused during the winter months are now being opened for snowmobiling. There have been a number of snowmobile trails established throughout the basin and many more are being proposed.

In response to requests from states and interested individuals, the Lake Central and Northeast Regional Offices of the Bureau of Outdoor Recreation and the New York State Conservation Department sponsored an International Snowmobile Conference at Albany, New York, in May 1969. The purpose of this conference was to review proposals and recommendations based upon committee reports and through workshop discussions to develop policy and legislative guidelines for the future use of snowmobiles. This conference adopted specific recommendations for snowmobile trail design, location, and support facilities as well as a standard trail sign system. A more recent conference was held in January 1970, at Duluth, Minnesota.

The economic impact of snowmobiles is becoming considerable. Snowmobiling, like skiing, is reviving the economic atmosphere of once nearly dormant resort communities. Restaurants, service stations, drug stores, grocery stores, resorts, hotels, motels, and entertainment businesses are all sharing in the benefits.

Plate 4-34. Additional snowmobile areas and trails in and near the basin will help prevent uncontrolled abuse of the forest environment and lessen conflicts between snowmobilers and other recreationists. (Photo source unknown.)

The average snowmobile owner is a family man. It is estimated that over 80 percent of all machines sold are purchased as a family investment. Some indication of the increasing popularity of snowmobiling is offered by the following two statements: (1) it was estimated that nearly 150,000 snowmobiles were owned in the States of Michigan, Minnesota, and Wisconsin in 1967, and (2) a more recent survey indicated that nearly 225,000 machines are now owned by residents of these three states. Snowmobiling is a new winter outdoor sport that is very definitely here to stay and one for which adequate trails and areas must be provided. All three states in the basin are mindful of this need and are taking steps to provide necessary trails. Counties and private groups were instrumental in establishing snowmobile trails in 61 of Wisconsin's 72 counties in 1967. In 1967 the State of Minnesota inventoried 3,147 miles of snowmobile trails in the state. Michigan has developed over 100 individual snowmobile trails for use by snowmobile owners (See Plate 2-4).

Although the majority of existing snowmobile areas and trails in the States of Minnesota, Michigan, and Wisconsin are found on public lands, the future involvement of private interests in the sport will become more and more significant. An increasing availability of private lands for snowmobiling may prove instrumental in reducing increasing use pressures on public lands.

Skiing - With the exception of most of the eastern half of Zone 1 and portions of Zone 3, skiers find an abundance of snow covering a gently to steeply rolling landscape during the winter season, creating an ideal setting for skiing enjoyment. There are 19 ski resorts having 130 slopes and providing 89 tows and lifts in the Lake Superior Basin (See Table A-3 and Plate 2-4). The Suicide Hill Ski Jump located near Ishpeming, Michigan, draws outstanding jumpers from throughout the world for championship competition. Also located at Ishpeming is the National Ski Hall of Fame. Several ski areas are found in the vicinity of Ironwood, Michigan.

Although skiing is steadily gaining in popularity, several factors are tending to limit its growth in the Lake Superior Basin. Remoteness of ski areas from major population centers is the primary reason. Other contributing factors affecting not only the Lake Superior Basin but many other areas in the nation as well are: (1) the relative difficulty of learning to ski, (2) the considerable expense involved (equipment and lodge fees), and (3) the increasing number of ski areas being opened near major population areas.

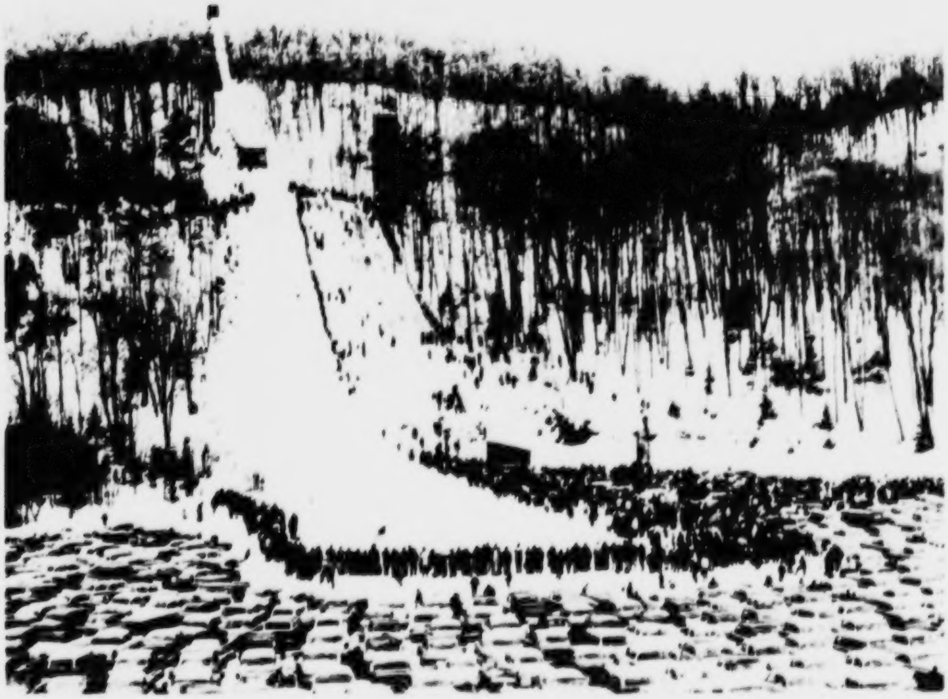


Plate 4-35. Suicide Hill ski jump at Ishpeming, Michigan--site of the national ski jumping championships. (Photo by Michigan Tourist Council)

Other Winter Sports - Skating, sledding, and tobogganing are activities in which the whole family can participate and for this reason are very popular with basin residents. The rolling topography and many inland lakes provide an unlimited opportunity for these three winter pastimes. The availability of numerous public facilities and large acreages of both public and private lands has largely precluded development by private interests in these activities.

With the availability of large numbers of inland lakes, ice fishing is engaged in by a significant number of basin residents throughout the long winter season. Nationally, ice boating is an activity that is gaining in popularity. However, because of the heavy snow cover in most portions of the basin during the winter, participation in this activity has been limited.

PROPOSED AND POTENTIAL RECREATION AREAS

Public. Following is a discussion of areas in the basin that are: (1) in the early stages of development and use, (2) being programmed for some form of recreation development, or (3) for which only preliminary consideration has been given for their development as recreation areas. In addition to those areas included here, there are other areas in the basin for which some consideration has been given in the past or for which consideration might be given in the future. Wisconsin's Apostle Islands and Kakagon and Bad River sloughs, Michigan's Huron Mountains, and portions of Minnesota's North Shore are areas possessing natural attributes of sufficient quality which could meet qualifications as national recreation areas or, in the case of the slough areas of northern Wisconsin, might receive consideration under the recently enacted Estuarine Act. If consideration at the federal level determines these areas to be unqualified, perhaps state management considerations might be applied. A discussion on concepts of basin development is included at the beginning of Chapters 5 and 7.

Federal- The Pictured Rocks National Lakeshore was authorized by Public Law 88-668 in October 1966. In the publication, "Pictured Rocks National Lakeshore, A Proposal," (111) the Department of the Interior recommended:

(1) Establishment, as a unit of the National Park System, of a Pictured Rocks National Lakeshore comprising approximately 67,000 acres in the area lying between Munising and Grand Marais, Michigan.

(2) Acquisition by the federal government of a 28,000-acre lakeshore zone to provide recreational opportunities in an unspoiled natural environment.

(3) Designation of a 39,000-acre buffer zone to provide protection of the watersheds and the forest setting.

(4) Construction by the National Park Service of a noncommercial scenic road to facilitate circulation within the lakeshore, access to recreational opportunities, and enjoyment of the features.

(5) Designation of the Beaver Basin as a natural area, containing only trails and minimum facilities necessary for the visitor's enjoyment.

(6) Construction of a hiking trail along the entire length of the inviolate lakeshore zone and small campgrounds at convenient locations for hikers.

Plate 4-36. The easternmost extension of the Pictured Rocks National Lakeshore contains the Grand Sable Dunes -- an interesting and scenic environment of grass, sand, and pines. (Photo by Michigan Department of Natural Resources.)

(7) Emphasis to be given to providing public use facilities which encourage

potential which the area possesses. In the event that a national lakeshore is not realized, the application of state outdoor recreation management policies could provide some suitable alternatives.

The Sylvania Recreation Area is now under United States Forest Service ownership and administration. Money from the Department of the Interior's Land and Water Conservation Fund was used to purchase the area at a cost of $5.7 million. Proposed development of the nearly 20,000 acres of forests and waters includes facilities for riding, hiking, portage trails, canoe routes, camping, picnic sites, and nature interpretive areas. In 1966 it was anticipated that an additional $6 million would be needed for development of roads and facilities over the next five years (78). All but a very small portion of this area lies within the Lake Superior watershed.

Public Law 90-543 established a National Trails System and authorized a study of 14 potential trails, one of which is the North Country Trail. When established, this trail will extend 3,170 miles from the Appalachian Trail and Green Mountains in

Plate 4-37. Isle Royale's Greenstone Ridge Trail is well known to visitors of that island. The Lake Superior Basin has the necessary land and water resources to provide additional similar trails. (Photo by Michigan Tourist Council.)

Vermont to the Badlands of western North Dakota where it will connect with the Lewis and Clark Trail. It will traverse the entire length of the basin from east to west (94). The exact geographic location of the trail has not yet been finalized.

For management purposes, the Forest Service has divided the Sylvania tract into three main zones. (1) 1,650 acres to remain wild except for some backpack campsites and necessary portage trails, (2) 5,000 acres to be set aside for scientific study and public education, and (3) a general forest area of 4,650 acres to be used for timber management and light recreation use. A fourth zone of almost 3,000 acres includes water areas and connecting trails and portage routes. In its management plan for Sylvania, the Forest Service emphasizes the objective, "to maintain the unique quality of Sylvania's forest lands and waters, while providing opportunity for a variety of outdoor recreation opportunity." The only way in which access to the inner portion of the area can be gained is either by canoe or backpack. Presently, there are a total of 99 wilderness campsites having a capacity of only 600 persons. These campsites are scattered throughout the area alongside lakes and streams in groups of three. All are located 100 feet or more from stream banks and lakeshores. Intensive day use areas are being developed, but only on the edge of the tract. One such area is found on Clark Lake where picnic facilities are provided and at which a bathhouse concession stand to accommodate use of the lake's white sand beach will be constructed. The Forest Service's policy of selected timber cutting on designated areas will be allowed only between December 1 and March 31.

Another tract of heavily forested land, nearly as large and similar in its wild character to Sylvania, will soon come under full control of the United States Forest Service. This tract of more than 17,000 acres of land (the McCormick tract) was donated by private interests to the federal government to be managed primarily as an experimental forest. The tract is located in Marquette and Baraga Counties, a rolling country that rises toward the Huron Mountains in its northern fringes. Some 18 lakes and 10 miles of trout streams break the landscape. The waters are of excellent quality and, while preliminary indications are that the lakes do not contain substantial numbers of fish, fish management as it is being applied in Sylvania may aid in improving the fishing here. At present, camping and hiking are permitted, but no wilderness campsites have been constructed as yet. Camping is not permitted within 100 feet of any lake or stream. More than 100 miles of trails which skirt nearly all of the area's lakes and streams were marked out by the original owners. All trash and refuse must be packed out by campers. The Forest Service has not decided upon a specific management plan and probably will not do so until a complete study of the area is made. A minimum of recreation development in this area would best fit its natural semi-wilderness qualities.

A good example of an administering agency's cognizance of the scenic potential in the Lake Superior Basin is the Black River development located in Gogebic County (See Plate 4-17). Originally owned by the county, the 4,000 acre area is now being managed by the U. S. Forest Service. The area provides an interesting natural history--its geology exposed by the gorge of the Black River which contains waterfalls and scenic overlooks. In the scenic corridor are found approximately 605 acres of virgin hemlocks. The river falls 411 feet from the area's south boundary in Wisconsin to Lake Superior, tumbling over ancient bedrock - greenstone and granites and layers of slates, quartzites, iron ore, conglomerates, and lava flows. Early copper prospectors worked the Black River; explorers, missionaries, and fur traders used the natural harbor at the river mouth.

The following mentioned developments are either now provided or to be provided by the U. S. Forest Service in this area. These include a campground in hills above the park, close enough to the present shelter to be used for nature interpretive programs for campers. Also in various stages of planning or development are bathing beach improvements, stairs and lookouts at the waterfalls, foot trails along both sides of the river, a concession stand at the picnic area, and additional tables and toilets.

As part of its five-year land acquisition and development plan, the U. S. Forest Service is acquiring other lands and planning additional outdoor recreation developments on national forest lands in the basin. An example is the planned construction of the 25-mile long Big Sea-Water Scenic Drive along Lake Superior's Whitefish Bay. This highway will be complemented by existing campground and picnic areas. Additional proposed developments include a 60-unit campground, a boat launching area, marina, hiking and riding trails, and roughing areas (80).

Senate Document 826 is a bill proposing that certain lands in Michigan and Wisconsin be designated as wilderness areas in accordance with the Wilderness Act of 1964. Included in these lands are the Huron Islands, a group of eight small islands containing approximately 147 acres and located three miles off the wild south shore of Lake

Superior near the Huron River and Huron Mountains in Marquette County. These islands are presently part of the National Wildlife Refuge System. The small, almost barren rock islands on the eastern extremities of the group are the nesting sites of a principal herring gull colony. Trees, shrubs, and herb plants cover two-thirds of the island's surface; the remainder is exposed rock, partially covered with lichens and mosses, which reveals deep glacial groving. Under the proposal, the islands would be guaranteed protection from commercialization or other developments and be maintained as a natural area (75).

Indian territories of the Lake Superior Basin have potential for possible recreational use. There are seven Indian reservations in the Lake Superior Basin comprising approximately 135,000 acres of land and water. At present, the Bureau of Indian Affairs foresees only limited development of picnic and camping areas, beaches, and additional roadways. A lack of necessary funds would preclude any substantial development, and the complicated breakdown of allotted ownership could cause problems in administration. Possibly an even greater hindrance is an unawareness on the part of the Indian people of the opportunities afforded by recreation development that could benefit them both socially and economically.

The mere presence of Indian lands maintains a particular appeal to many visiting tourists. If additional access to tribal lands could be initiated, an interesting, educational, and more meaningful cultural relationship might develop between visiting tourists and Indians. Such a program would, of course, be contingent upon full consent and acceptance of the Indian people. The Indian would then have the opportunity to benefit economically. While Indian lands should be considered as a possible future recreation resource, development of these lands is not highly essential in light of existing extensive stretches of federal and state forest lands.

A Department of the Interior Report, "A Proposed Grand Portage Indian Park and the Grand Portage National Monument," examined the social and economic opportunities which would be made available to the Chippewa Indian Tribe of Minnesota in the establishment of an Indian park along the northeast Minnesota portion of the Lake Superior shoreline. Completed in June 1967, the report was prepared by a task force consisting of the National Park Service, the Bureau of Indian Affairs, the Minnesota Chippewa Tribe, including the Grand Portage Band, and the State of Minnesota (109).

Plate 4-38. A report prepared by the National Park Service in 1967 recommended the establishment of a park to protect and emphasize the scenic and historical values of the Grand Portage area. (Photo by Minnesota Department of Conservation.)

Essentially, the report recommended establishment of the park, initially to be under the general direction of the Secretary of the Interior, but eventually to be managed by the Grand Portage Band of Chippewa Indians. The proposed park would include approximately 12,644 acres, 24.3 miles of frontage along the Pigeon River on the United States and Canadian border, 28.7 miles of Lake Superior shoreline, and 14 off-shore islands.

If a park of this type were established, an area of historical significance, primitive and undeveloped, would be protected from the uncoordinated type of development which has been all too prevalent on the Great Lakes shoreline. This area was identified in the National Park Service's "Our Fourth Shore" as one of seven with outstanding national significance along the Great Lakes.

State - The State of Michigan, as part of its 10-year recreation plan, has placed a priority on acquisition and expansion of state parks and recreation areas within the

Lake Superior Basin. Under a high priority land acquisition category, the state will eventually acquire an additional 100 acres for Porcupine Mountains State Park and purchase 12,000 acres for the Craig Lake Wilderness area in Baraga County. Acquisition of 1,200 acres for the expansion of other Lake Superior Basin parks is also planned. Included in this amount are an additional 1,000 acres for the existing Tahquamenon Falls State Park (33).

Under the present 10-year program recommended by the Minnesota Outdoor Resources Review Commission, two state parks which lie in the Lake Superior Basin will be increased in size, Baptism River State Park by 100 acres, and Judge Magney State Park by 3,200 acres. Capital improvement plans for all 12 Minnesota state parks within the basin total approximately $900,000 for the 10-year period.

Duluth, Minnesota has prepared a five-year plan for the development of parks, recreation facilities, and historical sites. Specific projects include reconstruction of the Fond du Lac fur trading post, improvement to the city zoo, expansion of the Indian Camp Tourist Camp, and development of historical sites in West Duluth, Fond du Lac, and along the Skyline Parkway.

In addition to providing capital improvement money for existing state parks, the State of Wisconsin has begun development of Big Bay State Park, located on the Big Bay portion of Madeline Island. This park, when all land is acquired, will consist of 1,700 acres. The state recently acquired Oak Island, one of the Apostle Islands, which has now been added to the Apostle Islands State Forest. Stockton and Basswood Islands are also components of the Apostle Islands State Forest which now comprises a total of approximately 16,000 acres.

Four potential canoe routes designated in 1963 and 12 additional routes named in 1967 are being studied in Minnesota by Midwest Planning and Research, Incorporated, under contract to the Minnesota Conservation Department. Of the original four, the Cloquet and St. Louis Rivers are near the Duluth-Superior metropolitan area. Development of these streams would benefit Duluth-Superior residents as well as people from outside the basin.

Projected Private Developments - In many aspects private development in the Lake Superior Basin is similar to that throughout the United States. The peak of development was by small investors, and "roadside" business concepts prevailed. Large investments in the basin have been discouraged by various factors, foremost of which are remoteness from urban markets and a scarcity of labor. The emphasis upon seasonal business establishments has resulted in a lag behind businesses in size and volume of business (7). This in turn has affected the establishment of recreation-related services.

Despite past history, there are circumstances which may alter the situation as far as outdoor recreation, tourism, and associated development are concerned. Indicative of dramatic shifts in Upper Peninsula development are announcements and plans for new outdoor recreation developments as discussed in this report. Currently, millions of dollars worth of attractions, facilities, and services are in various early stages of implementation. Most of this represents federal and state investment; some is private and some is a blend of local, private, state, and federal action. Generally, these new investments are complementary both to one another and to existing development (7).

With the establishment of public recreation developments in Sylvania, Pictured Rocks, the Apostle Islands, and other areas, opportunities for private investment in lodging, restaurants, and facilities supporting recreational activities should improve considerably.

Private seasonal homes will continue to increase in number as land nearer the southern urbanized areas of the basin states becomes less plentiful and more costly.

Chapter 5
Needs

GENERAL

Generally speaking, in the past government agencies have used much of their financial resources for the purchase of land and delayed development until a later date. Recently, with the increasing numbers of recreationists and varieties of recreational activities, many resource managing agencies have placed an emphasis on the development of recreational facilities on lesser developed lands. Even more recently, however, especially with the passage of the Land and Water Conservation Fund Act of 1965, emphasis has also been given to the acquisition of additional lands, particularly near metropolitan areas and areas of outstanding recreational resources.

The immediate need for additional developed recreation lands and facilities to serve large numbers of recreationists in the Lake Superior Basin is not nearly so great as that required in the other Great Lakes Basins. Although campgrounds in some of the more popular state parks are filled to capacity during certain periods of the summer season, most federal and state forest campgrounds maintain a less than capacity load. The latter named campgrounds are not as widely publicized or as well known to the outdoor recreationist as are the region's state parks. Generally, other recreation facilities at the basin's park, forest, and recreation areas also tend to maintain uncrowded conditions.

Much of the type of outdoor recreation activity that people seek in a resource area such as the Lake Superior Basin can and should occur so that an uncrowded experience is attained. If this concept is adhered to by responsible managing agencies, necessary facility development will be kept to a minimum and undesirable alteration of the region's character will be avoided.

The presence of large tracts of public land would appear to offer a generous supply of readily available land for future outdoor recreation use. While this is largely true and is a favorable characteristic, it does not preclude the need to acquire private lands for recreational purposes. Many areas that offer the greatest scenic, historical, and recreational opportunities (including lakes and streams with potential for recreational use) are under full or partial private ownership. Therefore, the possibility of acquiring such lands should not be ignored. The Sylvania Recreation Area and the Pictured Rocks National Lakeshore are areas in the Lake Superior Basin which possess extraordinary natural attributes in which private lands were purchased by the federal government in spite of large amounts of nearby less desirable public lands. The future need for additional recreation lands near municipal areas may also require the purchase of private lands offering necessary recreation opportunities.

PRESENT NEEDS

In general, the needs of the Lake Superior Basin are a part of the total needs of the three states involved. Since these are discussed in each state's comprehensive outdoor recreation plan, they will not be elaborated on here (35, 53, 119). The purpose of this chapter is to evaluate the basin's present and future recreation needs The three zones within the basin exhibit varying degrees of needs, and the translation of these needs into resource requirements is intended primarily to show relative comparisons. The methodology used to analyze the basin's needs is presented in Appendix B.

The figures in Table 5-1 portray what the basin's need for developed recreation acreage was in the year 1965. Camping, picnicking, fishing, boating, and swimming (with associated beach activity) were considered to be the basic activities which require additional developed land. Results of the analysis indicated: (1) a need for additional developed acreage in Zone I; (2) a supply of developed acreage that is just adequate in Zone II; and (3) a more than adequate supply of developed acreage in Zone III. At the present time, most recreation facilities in all zones receive light to moderate use. These acreage needs pertain to the entire zone in each case, and particular locations having either a surplus or a scarcity of facilities are not reflected by these figures. An inspection of Table 5-3 on page 5-5 reveals a considerable need for developed recreation lands in the future.

These acreages are considered necessary to support the maximum number of people expected to use recreational facilities at any one time on a normal summer Sunday. The acreages are based on the following classification of recreation areas suggested by Marion Clawson, et al., in Land for the Future (17).

Table 5-1

REQUIREMENTS FOR DEVELOPED RECREATION ACREAGE

LAKE SUPERIOR BASIN 1965
(Nearest 100 Acres)

(1) Zone	(2) Total Required	(3) Present Existing for Public Use*	(4) Deficit or additional Needs (Column 2 less Column 3)
1	1,800	1,000	800
2	2,800	2,800	---
3	1,400	1,900	-500
Basin	6,000	5,700	300

*See Table B-4, Appendix B.

(1) User-Oriented Areas - User-oriented areas, represented by city, county, and other local type parks, are usually located near the user regardless of the quality of resources available. User-oriented areas may be compared to Class I-High Density Recreation Areas as defined by ORRRC in "Outdoor Recreation for America."

(2) Intermediate Areas - Intermediate areas, represented by state and regional type parks, utilize the best available resources within a reasonable distance of the user. They may be compared to Class II - General Outdoor Recreation Areas as defined by ORRRC. To some extent, intermediate areas may also include the more highly developed Class III areas.

(3) Resource-Oriented Areas - Resource-oriented areas, represented by national parks and forests, and some large state parks, are located in areas of outstanding resources. This category is based on location of resources and not necessarily on the needs of people. The Superior, Chequamegon, Ottawa, and Hiawatha National Forests, the numerous state forests, and Isle Royale National Park, all ORRRC Class III areas, are representative of this category. Esti-

mates of developed acreages were made wherever recreational facilities existed in those areas.

The acreage presented as "Deficit" in Table 5-1 indicates the additional acreage needed in each zone if divided equally between user-oriented and intermediate type of areas. This approach was necessary because the classification of existing areas into the two types is not clear-cut. An intermediate area may be user-oriented for a certain portion of the population, and both types of areas can support essentially the same activities.

In conjunction with the developed acreage necessary to support the five basic activities, other lands must be provided for the more extensive recreational uses such as hiking, hunting, sightseeing, and nature walks, as well as providing desirable buffer areas.

Depending upon the ability to provide these areas, and considering use pressures, the deficit figures will be subject to modification. For example, if additional studies should show the user-oriented areas are needed in preference to intermediate ones, the figures could be somewhat lowered; or, if intermediate areas required more attention, the figures could be raised. (User-oriented areas support more people per unit of land; intermediate areas by their nature require more land per person.) The basin's developed acreage needs are related to basic facility deficiencies in Table 5-2.

Table 5-2

ADDITIONAL DEVELOPED ACREAGE
AND PRINCIPAL FACILITIES NEEDED, 1965

Lake Superior Basin

Zone	Acreage	Principal Facilities
1	800	Camping, Fishing, Boating, Picnicking
2	---	
3	---	

* From Column (4), Table 5-1.

Deficiencies of developed recreation land and facilities exist in some areas, primarily at the basin's more popular state parks and near municipalities.

FUTURE NEEDS

Table 5-3 estimates future developed acreage requirements for each zone and for the Lake Superior Basin. It is estimated that the future needs for the five activities (boating, camping, fishing, picnicking, and swimming) will grow more than 200 percent by the year 1980, and by 2000 they may be expected to increase nearly five times over the presently needed acreage.

These projections are based upon the combined demand increases estimated for the market area and vacation sectors of the basin's total demand. Anticipated increments of growth in the basin's population and per capita income were applied to the market area sector of demand. It was assumed that the vacation portion of the basin demand will closely parallel the national average in population growth and increase in per capita income. Future requirements, therefore, reflect the needs of the vacation and tourist portion as well as those of the resident and nearby non-resident population.

Table 5-3

FUTURE REQUIREMENTS FOR DEVELOPED RECREATIONAL ACREAGE

LAKE SUPERIOR BASIN*

(Nearest 100 Acres)

Zone	1965**	1980	2000	2020
1	1,800	4,900	8,100	11,200
2	2,800	8,800	13,500	18,300
3	1,400	4,500	6,400	8,200
Basin	6,000	18,200	28,000	37,700

* See methodology in Appendix B

** From Column (2), Table 5-1

Recently there seems to be a growing need for additional developed land for recreational purposes at some locations in the basin. Most of this need should be able to be satisfied through the development of additional public lands. In the future, it is expected that greater numbers of people will travel to the basin, increasing the demand on the basin's recreation resources. As increased tourist use of the basin does occur, additional stores, lodge facilities, and restaurants will need to be provided by the private sector.

Chapter 6
Water Quality Influences

GENERAL

Basin Water Quality. Water pollution problems in the Lake Superior Basin exist primarily near municipalities scattered along the Lake Superior shoreline and on portions of basin tributaries and inland lakes. Generally, a sparse resident population and a limited amount of industry have resulted in fewer and less intensive water quality problems than in any of the other Great Lakes Basins.

To be properly and fairly evaluated, however, the pollution problems of the Lake Superior Basin should be examined in their own light. When consideration is given to the harmful effects that existing pollution sources now have, and, more importantly, the worsening effects that such sources may impose on future outdoor recreation activities and environmental quality, there is reason for not only concern, but action to correct the present situation before it worsens.

The main body of Lake Superior contains waters of extremely high quality which should be protected to the greatest extent possible. Early prevention of pollution is a much more sensible and practical approach than are later, highly expensive attempts to restore waters which have been allowed to become extensively polluted, as evidenced in the case of Lake Erie and more recently in Lake Michigan. The objective to keep Lake Superior as clean as possible becomes even more urgent when it is considered that its waters are the major source of supply for the other Great Lakes.

Sources of Pollution. Domestic and industrial pollution sources are the major causes of the water quality problems that exist in the Lake Superior Basin. Contributing to a much lesser degree are: (1) the run off from agricultural lands, (2) building and land construction (highways, subdivisions), and (3) natural erosive processes.

Generally, limited acreages of land under cultivation and an abundant forest cover have protected the landscape, resulting in few sedimentation problems. There are several tributaries in the vicinity of the Michigan-Wisconsin border and the Bayfield Peninsula which are carrying suspended red clays and minerals in their waters. Several of these streams are located in or near public outdoor recreation areas. These suspensions are primarily of natural origin (eroding clay banks), but may also occur as a result of highway and building construction.

Inefficient and inadequate municipal sewage treatment plants, combined sanitary stormwater systems, and, in some cases, raw sewage wastes are polluting lakes and rivers to some degree at practically every municipality in the basin. Some of the pollutants stem from numerous smaller municipalities which collectively alter the quality of the environmental landscape.

Concentrations of industrial wastes are found in the cities of Duluth and Cloquet, Minnesota; Superior and Ashland, Wisconsin; Sault Ste. Marie, Canada; and Munising, Hancock-Houghton, and Marquette, Michigan. Pulp mills, copper and iron mining companies, paper manufacturers, steel mills, breweries, and power companies, in addition to small manufacturing concerns, are found in these and other municipal areas. As a result, coliform concentrations, trace metals, phenols, thermal additions, oxygen-consuming substances, suspended matter, and toxic materials are entering Lake Superior and tributary waters. There are also instances of various chemical and fly ash wastes present in the atmosphere near a few of the industrial sites.

Oxygen depletion is occurring in some of the basin's tributaries. In the Minnesota drainage, reaches of the lower St. Louis River from Cloquet to the Duluth-Superior harbor have on numerous occasions been excessively depleted of oxygen. Inadequately treated sewage effluent and inadequately treated industrial wastes discharged into this reach have been the source of the problem. The condition is aggravated by the operation of the hydroelectric plants on the river which cause wide fluctuations in river flow (103).

Sources of waste in the Duluth-Superior harbor have also created localized areas of substantial oxygen depletion. Sources of pollution include inadequately treated municipal wastes and inadequately treated industrial wastes from various points. The interstate Montreal River downstream from Hurley, Wisconsin, and Ironwood, Michigan, has experienced oxygen depletion problems. The proportion of the oxygen deple-

Plate 6-1. Contaminants from a variety of municipal and industrial sources are vividly in evidence in this photo of the Duluth harbor entrance. (Photo by the Federal Water Quality Administration.)

tion caused by the waste discharges from each of these two cities has not been determined (103).

From a bacterial standpoint, the quality of the main body of Lake Superior is excellent. The problems of bacterial contamination that have occurred were found along certain tributaries and some harbor or inshore areas around the lake. Some of the areas that have experienced bacterial pollution are portions of the St. Louis River and Duluth harbor area in Minnesota, the Superior harbor area, Ashland inshore area, and reaches of the Montreal River in Wisconsin (103).

Scientists of the U. S. Bureau of Commercial Fisheries have found that pesticide concentrations in Lake Superior fish are the lowest in the Great Lakes -- only one fourth to one-third the concentration of Lake Michigan fish (108). However, the fact that present pesticide concentrations in Lake Superior fish have developed over a relatively short period of time and the fact that salmonoids tend to accumulate pesticide concentrations have caused the U. S. Bureau of Commercial Fisheries to express concern over future concentrations in sport fishes.

Some cities in the basin are served by combined sewer systems so that quantities of a mixture of storm water and sewage are discharged without treatment during and after heavy rains. This has resulted in bacterial pollution of some reaches of rivers in the basin. Bacterial pollution in most cases is amenable to correction.

This is the case wherever the waste can be put through a treatment plant and then disinfected (103).

Commercial ships are creating unsightly waters in the Duluth-Superior area by dumping their refuse, bilge, and other wastes near shorelines and harbors. These ships are a constant threat to extensive beach and park areas all along the Lake Superior shoreline.

The piping of raw wastes and the seepage of effluent from improperly placed septic systems of seasonal homes is reaching the waters of Lake Superior and some basin lakes and streams. The absence of extensive seasonal home development along most inland lakes and streams thus far has prevented serious pollution problems at these locations. Unless corrective actions are taken now, however, increasing seasonal home development could create problems similar to those now prevalent in the other Great Lakes basins.

Another type of pollution for which municipalities, industries, and private individuals are all responsible is general refuse such as tin cans, old automobiles, paper, garbage, and other assorted by-products of our society. River banks, floodplains and unused public lands have long been a favorite location for trash disposal. Beaches, picnic areas, campgrounds, and other recreation facilities suffer from waste deposition. Ironically, recreation lands and waters are often littered by the same people who are searching for a natural environment in which to enjoy themselves.

EFFECTS OF WATER QUALITY ON RECREATION

Swimming. The most common water quality problem affecting swimming and associated total body contact activities is bacteriological contamination. Pathogenic organisms associated with human intestinal wastes pose a serious health threat to recreationists coming into direct contact with the water. Swimmers, water-skiers, and skin divers are all susceptible to a variety of diseases including gastro-intestinal inflammation, typhoid fever, infectious hepatitis, and dysentery.

Often ignored in surveillance and monitoring programs are those substances which are by-products of our technologically advancing society. New chemicals, industrial processing wastes, and agricultural pesticides are reaching surface waters in increasing quantities. Some have the potential to seriously injure those who come in contact with or ingest untreated water--primarily the swimmer.

The presence of certain suspended materials, residues, and nutrients, although less dangerous, can affect the physical appearance of water and detract from the pleasantness of the water environment for swimmers, water-skiers, and beachcombers. Esthetic degradation of bathing water quality often deters water contact activity much more quickly than potential health hazards. Floating debris, turbidity, obnoxious odors, and encroaching vegetation can either eliminate or greatly lessen swimming activity.

Plate 6-2. Litter and debris are not an exception, even in the far reaches of the northern Great Lakes. A photo of the beach at Duluth's Minnesota Park Point Recreation Area. (Photo Courtesy of the Duluth Herald)

Boating. Two primary concerns of the boater are that the water be esthetically desirable and that it be free from any materials which could damage equipment. Extreme acidity or alkalinity can both damage equipment and contribute to an undesirable esthetic situation. The same can be said for floating debris, residues (oils and grease), and a wide range of chemicals. Except in the case of an accident, where the recreationist may come in contact with the water, health considerations have received less attention.

Hunting and Fishing. In hunting and fishing, it is usually the needs of the fish and game which determine water quality requirements. This is in contrast to other outdoor activities where participant desires determine necessary water quality. Any significant change in the biochemical composition or physical nature of water will, in turn, affect the make-up of the native biotic community. This necessitates scrutiny of a wide variety of parameters that may upset this balance. Variables include water temperature, oxygen content, turbidity, pH, and chemical compounds (including pesticides and herbicides).

The use of aquatic organisms as an indicator of water quality deterioration could be useful in preventing future harm to not only fish and wildlife values but also to other water-oriented outdoor recreation activities as well. Fish and other aquatic organisms tend to feel the effects of subtle, sometimes intermittent, changes in water quality long before pollution has progressed far enough to affect human affairs (107). After the latter occurs and after environmental quality, fish and wildlife, and recreational values are already damaged, then, and only then, is corrective action usually taken.

Water-Enhanced Activities. The fact that persons will often select a picnic area or campground near a small lake or stream, or that a hiker will leave the main trail to rest beside a brook, reveals that many people who seek outdoor recreation prefer to be near water. Even though an activity may not require actual contact with the water, an outdoor experience is enhanced through the presence of water. Consequently, impairment of the water quality will, in turn, lessen the enhancement of the experience.

Undesirable conditions that can impair the esthetic appeal of any body of water include plankton blooms; excessive algae growth; slime infestations; visible floating, suspended or settled solids; obnoxious odors; excessive water temperature; high turbidity; and floating dead fish (31).

These conditions are primarily the result of inadequately treated sewage wastes and industrial effluent. Industry and both commercial and pleasure boats often impair water quality with petroleum residues (primarily grease, gasoline, and oil), exhaust particles from smoke stacks, discolorations from chemicals (including acid wastes), and other suspended matter (31).

Garbage and refuse littering stream banks and waters can come from recreationists themselves, and leave an unsightly condition for others passing through after them.

Participation in water-enhanced activities is greatest when the waters support a desirable aquatic community and are safe for water-dependent activities. Camping or hiking may be the primary objectives of a vacation, but choice of site or route is often determined by the availability of high quality waters suitable for a variety of uses.

WATER QUALITY PARAMETERS

There are two qualities which must be assured in recreation waters; the absence of health hazards and the presence of desirable esthetic quality. Many pollutants have a detrimental effect on both of these desired qualities. A listing of common contaminants and some of their harmful effects are found in Table 6-1. Only the more common substances known to gain entry into basin waters are considered. It should also be understood that the headings used in the contaminant column, e.g., pesticides, and the following listed effects are general in scope and are not to be construed as all-inclusive.

Table 6-1

Contaminants	Effects
Phenois*	Impart obnoxious odors and tastes to the water and the fish within. In very small concentrations they are also toxic to fish.
Acids and alkalines*	Toxic to aquatic life and damaging to recreational equipment.
Heavy metals, e.g., lead, arsenic, zinc, and chromium	Toxic to fish, wildlife, and humans.
Oxygen-consuming substances* e.g., starches, sugars, and also previously mentioned human wastes and soil particles	Detrimental to fish and other aquatic life and can cause odor and taste problems.
Chlorine	May be detrimental to fish and other aquatic life. Causes eye irritation in swimming pools.
Dyes	Some varieties are toxic to fish and all affect the water's natural color.
Temperature-warmed water	May impair esthetic quality of swimming water and has a deleterious effect on other elements contained within the body of water. Extremes may harm aquatic life and/or stimulate growth of nuisance aquatic plants. Under certain conditions may be beneficial for swimming in cold bodies of water.
Radiation	Certain rays or radioactive substances above certain levels may be detrimental to aquatic plant and animal life and a threat to human health.
Pesticides*	Harmful to all forms of aquatic life and any organisms ingesting the water, including humans.
Human digestive wastes and associated bacteria	Causes obnoxious odors, is visually unsightly, and detrimental to human health and aquatic life.
Soil	In large amounts clays and silts are visually unsightly, detrimental to aquatic life, and sedimentations tend to shorten the life of reservoirs and lakes. Soil can be a carrier of harmful chemicals such as phosphates and pesticides.
Oils,* gasoline, and greases	Injurious to fish and wildlife, esthetically displeasing and damaging to recreation equipment and beach areas.
Nutrients, including fertilizers (phosphates)*	Stimulates nuisance aquatic growths which are esthetically and physically detrimental to recreation activities.

*Also found in combination with several other pollutants.

It is difficult to determine exactly when each of these polluting substances becomes concentrated enough to be harmful. Reactions often take place between chemicals which cause them to be much more dangerous in combination than they were individually. Warmed waters, for example, may start or intensify a chemical reation which would ordinarily be subdued by the water's natural temperature. Each body of water and each entering foreign entity must be approached on an individual basis if deleterious effects are to be accurately analyzed and corrected.

CASE STUDIES

Duluth, Minnesota - Superior, Wisconsin. A significant water quality problem exists in the lower St. Louis River and the entire bay area of the cities of Duluth, Minnesota, and Superior, Wisconsin. The several sources of pollutants include inadequate municipal and industrial wastes and navigational wastes.

In a 1961 report on the investigation of pollution of the St. Louis River, St. Louis Bay, and Superior Bay, the following recommendation was made: "Pending the completion of installation of facilities to control the discharge of ineffectively treated or inadequately disinfected sewage, bathing at Billings Park should not be permitted." Concentrations of coliform organisms found in samples collected at inlets located

Plate 6-3. Paper wastes from lagoons of the Superior Hardboard Company, seeping into Duluth harbor. A variety of other pollutants, including iron and steel, dairy, cement, and brewery wastes, are also being discharged into the harbor waters. (Photo by the Federal Water Quality Administration.)

Plate 6-4. Minnesota's Park Point Recreation Area, with its exceptionally long sand beach, is widely used by area residents. It lies very near the major sources of pollution in the Duluth harbor area. (Photo by the Federal Water Quality Administration.)

both north and south of the park indicated a potential health hazard to anyone having contact with the water (56).

Billings Park is a 32-acre municipal park which includes a swimming beach located near the mouth of the St. Louis River in Superior, Wisconsin. The park had a reported annual visitation of 8,000 persons in 1967. With an annual beach attendance of 5,155 persons in 1967 (14), and as a result of the park's closing for a period of four years (June 15, 1961 to June 15, 1965), an estimated 20,000 swimming days were lost because of the presence of water pollution.

The beach is now once again open to the public for swimming. However, coliform levels obtained during 1967 reveal an average count of 733/100 ml of water (14). Waters considered acceptable for whole body contact by the Minnesota Water Pollution Control Commission should not exceed an arithmetic average of 1,000 per 100 ml.

This does not appear to provide a very substantial safety margin.

Minnesota Park Point Recreational Area located at the mouth of the St. Louis River is a scenic park having a long strip of beach nearly six miles in length. The park comprises some 197 acres and is estimated to have had a visitation of over 200,000 persons in the summer of 1968 (13). Although the park has facilities for a wide variety of recreational pursuits, people use it primarily for summer water sports--swimming, water-skiing, scuba diving, and boating. Conditions at the present time are such that these water contact activities can be engaged in at Park Point. However, it is located very close to the same sources of pollution that closed Billings Park and other small parks on the St. Louis River. Careful scrutiny should be maintained, in addition to incorporating water pollution prevention measures, to avoid a similar situation as occurred during 1961-1965 at Billings Park.

Silver Bay. Since 1956, the Reserve Mining Company, a large producer of iron ore, has been emptying the residue of its taconite processing into Lake Superior. Large amounts of the tailings have settled to form a huge delta in front of the taconite plant. However, more than 50 percent of the discharge has settled into the deeper reaches of the lake. The present discharge of tailings is approximately 67,000 tons daily. The Reserve Mining Company, one of 15 processors of taconite in the basin, is the only one that empties its tailings wastes into Lake Superior.

The Reserve operation has for several years received complaints and allegations from conservationists and fishermen, who contend that the spreading of the tailings over a substantial part of the lake increases water turbidity, damages fishing grounds, and causes a slime residue on fish nets. To date, most of these charges are not fully substantiated by any complete scientifically conducted study. Until recently, there have been only limited surveys and analyses made of the suspended material being added to the water.

Both governmental and citizen concern for the emptying of tailings into waters of Lake Superior indicated a need for an in-depth study of the situation. A research study team composed of chemists, engineers, and biologists of various U. S. Department of the Interior agencies did conduct a scientific survey of the taconite situation during the summer of 1968.

In May 1969, the Lake Superior Enforcement Conference was held to consider the matter in addition to other water pollution problems of the Lake Superior Basin. In

Plate 6-5. The dumping of large quantities of iron taconite tailings into the waters of Silver Bay, Minnesota, poses a potentially damaging and far reaching threat to the aquatic life and pristine waters of Lake Superior. (Photo by Alfred Eisenstaedt--Life Magazine.)

connection with this conference, the Federal Water Quality Administration of the U. S. Department of the Interior, issued the report, "An Appraisal of Water Pollution in the Lake Superior Basin" (103). One recommendation of this report called for the continued surveillance of waters in the Silver Bay area by the Federal Water Quality Administration and the concerned states, with a report to be presented to the conferees every six months.

A follow-up conference was held during the fall of 1969 to establish additional recommendations. This conference concluded that there was "presumptive evidence that the discharges from the Reserve Mining Company endanger the health or welfare of persons in states other than the one in which the discharges originate, and that they also have a deleterious effect on the economy of a portion of the lake by reducing the organisms necessary to support fish life."

The conferees recommended that the mining company undertake engineering and economic studies aimed at finding alternative ways to reduce the discharge of tailings into Lake Superior by the greatest amount practicable, and that it submit a tentative timetable for necessary action to the Minnesota Pollution Control Agency within six months.

In a letter to the Chief of the Army Corps of Engineers, Secretary Hickel recommended a conditional three-year revalidation of the permit under which the company has been dumping its wastes. He said the revalidated permit should stipulate:

(1) That the Reserve Mining Company's discharge system be modified to prevent any portion of the tailings from being carried beyond the three-mile-square limit specified in the original permit.

(2) That the company adhere to the requirements and recommendations of the 1969 Lake Superior Enforcement Conference, as well as to the pollution abatement compliance schedule outlined in the Federal Water Pollution Control Act.

(3) That noncompliance with the above will result in revocation of the permit.

Other surveys and studies have indicated reason for concern for the dumping of taconite tailings and its subsequent effects upon Lake Superior waters. Dr. Louis G. Williams, an aquatic biologist, reported that periphyton communities along the North Shore area of Lake Superior indicated a trend toward accelerated eutrophication. His findings revealed the presence of taconite silt on the lake bottom from 10 miles north of Silver Bay to Duluth and the Apostle Islands. In a letter to the Wisconsin Resource Conservation Council, which was later published in Bioscience, he further expressed concern for the taconite's tendency to assume the form of colloidal particles and to spread through the waters of Lake Superior (115). These colloidal suspensions, he felt, were the principal agents for distributing trace metals throughout the Great Lakes. Trace metals are generally known to be essential for the growth of algae.

An analysis of findings from a survey by the Federal Water Quality Administration conducted during the period of September 15-19, 1967, concluded by stating, "The results give good reason to be concerned about the effect of this discharge and we should proceed with further studies to determine the extent of the hazard. The contribution of this waste discharge to the total nutrient input to the lake is a matter of major concern, as large quantities of waste are involved." The analysis indicated that samples obtained from various locations near the Silver Bay taconite plant contained sufficient amounts of copper and zinc which could prove toxic to aquatic life and could inhibit the reproduction of fishes (100).

At the present time, it is difficult to determine what ultimate effect the dumping of taconite tailings might have on aquatic plant and animal life, which could, in turn, affect the recreational uses made of Lake Superior. In order to give some indication of possible harmful effects that could be imposed upon recreational use and tourism in the Lake Superior Basin, it is necessary to ponder some possible consequences.

If the presence of trace metals does result in an accelerated growth of algae, if the presence of toxic metals do kill certain aquatic animals and inhibit reproduction of fish species, and if the accumulations of taconite silt that are being concentrated on the lake bottom and the smaller colloidal particles which are being suspended in the water and carried to other portions of the lake are affecting the growth and reproduction of plant and animal life, then eventually, the results might prove very detrimental to recreational uses of Lake Superior.

If the above conditions are either now occurring or do occur in the future, then the restoration of the lake trout, the recently initiated coho and chinook salmon stocking program, the annual steelhead trout runs, the dipping of smelt, and all other forms of fishing could be seriously damaged, which could, in turn, lessen the present and future enjoyment of visiting vacationists and tourists. Increased plankton concentrations or the growth of larger forms of algae would make present uses such as swimming, rock hunting, and beachcombing along shoreline areas much less enjoyable. The presence of nuisance plant growths would render the shoreline of the scenic North Shore Drive much less appealing to sightseers. The colloidal suspension of taconite particles would continue to impart a cloudy green tint to an otherwise clear blue and blue-green shoreline.

Chequamegon Bay Area. Another area of major concern is the Chequamegon Bay area around Ashland, Wisconsin. Several sources of contaminants have infected the bay area to the extent that aquatic life and recreational values are being threatened.

At the present time, the City of Ashland has a primary treatment system of very low efficiency. It is estimated that a daily biochemical oxygen demand (BOD) equivalent to the raw wastes of nearly 10,000 people are being discharged to the waters of Chequamegon Bay by the city's municipal plant (106). The Marathon Division of the American Can Company has discharged paper wastes directly into the bay. A lagoon constructed to hold the wastes has proven inadequate because of overflows and ruptures in the lagoon wall. These paper wastes carry a high demand for oxygen and have been estimated to contribute a daily BOD level equal to 2,000 pounds of organic waste material (106). In June 1968, the company did install a centrifuge which reportedly has lessened considerably the amount of waste material being placed into bay waters.

Another contaminant of potential harm to fish and to outdoor recreation in Chequamegon Bay is a red by-product of dynamite (TNT) manufactured by the E. I. Dupont de Nemours and Company explosives plant at Barksdale, Wisconsin. The red substance is being discharged into Boyd Creek about 1-1/2 miles upstream from Chequamegon Bay near the small town of Barksdale. This "red water" contains nitrates, sulfates, and an organic dye and is of a toxic nature (106).

A master of science thesis entitled "Study of the Toxicity of Ammunition Plant Wastes to Fishes" indicated the detrimental effects which wastes of this nature have on fish life (19). Although the large size of Chequamegon Bay might tend to localize the effects on aquatic life, some damage to the aquatic environment would have to be expected.

At the present time, three recreational areas (including beaches) at Ashland are still used by the public; two of these are used by swimmers. Although they are not yet considered to be unsafe for total body contact, the waters reveal visual evidence of

Plate 6-6. Nitrate wastes used in the manufacture of TNT are shown entering Chequamegon Bay near Barksdale, Wisconsin. These wastes impart a red discoloration to a portion of the bay and are known to be toxic to fish and other aquatic life. (Photo by the Federal Water Quality Administration.)

various pollutants and are esthetically impaired.

Munising, Michigan. A pollution problem exists at the vacation town of Munising centrally located in Zone 1 on the Lake Superior shoreline. There is visual evidence of pollutants in the effluent that emanates from the city's overloaded municipal sewage system (primary treatment). The effluent from the municipal plant is discharged to the Anna River near its mouth, causing the stream to take on a milky appearance for a distance of several hundred feet. The clouded water then empties into Munising's South Bay. The Kimberly Clark Corporation operates a paper plant which is located on South Bay near the mouth of the Anna River. Although control has been provided, adequacy of sewage treatment has not been fully established by the Michigan Water Resources Commission. The plant, on occasion discharges dyes to the bay waters. The dye has been know to discolor the water for a period of several days each month. No claim has been made that any direct effect on outdoor recreational use is occurring. However, the presence of the improperly treated sewage and dyes are dirtying and discoloring the bay and river mouth. The boats for the Pictured Rocks scenic cruise leave from this same bay, west of the pollution sources.

Marquette, Michigan. There is visual evidence of industrial waste material that is impairing recreational activity in the waters around Shiras Park in Marquette, Michigan. This municipal park provides a source of enjoyment for the residents of Marquette as well as for visiting tourists. Its primary use is for swimming, picnicking, and rock hunting. The presence of soot-like particles is causing disagreeable odors and imparting objectionable tastes to the surrounding water. These particles originate from the nearby Royal Oak chemical plant.

The concentration of the particles increases in intensity nearer the plant to the extent that the sand beaches are considerably blackened. Beaches adjacent to the plant are not part of the park, but they would make a fine extension of the present park beach. Except for a swimming pool at Presque Isle Park and a small beach located on the Dead River, Shiras Park provides the only other source of swimming enjoyment for the people of Marquette.

The chemical plant recently announced its intention to terminate operations at this location in the near future, which hopefully will eliminate the problem.

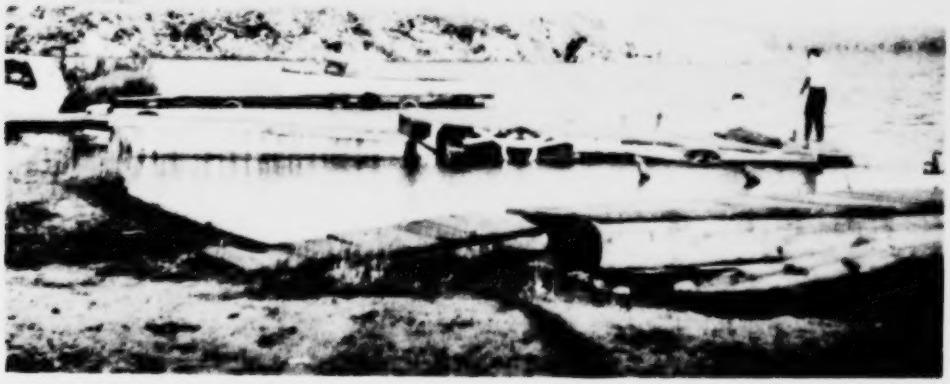
Houghton-Hancock, Michigan. Industrial and municipal contaminants and garbage, oil, and bilge wastes of Great Lakes freighters passing through the Portage Canal are polluting waters of the canal at the communities of Houghton and Hancock in Michigan's Keweenaw Peninsula.

The waters of two municipal beaches located on the canal and used by local people

Plate 6-7. One of several outlets that empty raw sewage into Torch Lake in Michigan's Keweenaw Peninsula.
(Photo by BOR.)

Plate 6-8. A sometime-used swim area found on Torch Lake's east shore, opposite the pollution sources. (Photo by BOR.)

Plate 6-9. Boys fishing near the lake's major pollution sources. (Photo by BOR.)



for swimming are lightly to moderately impaired. Although the water does not appear to be highly objectionable, it does not have a quality that is conducive to swimming enjoyment.

Industrial effluent and the discharge of raw sewage from several small municipalities have heavily polluted Torch Lake, an upper extension of Portage Lake and Canal. Exhibiting visual evidence of pollutants are a swim area and small beach found on the lakeside farthest from the pollution sources. Recently, the Calumet-Hecla Smelting Plant, the major polluter of Torch Lake, announced termination of operations as a result of recent mine closings in Michigan's Upper Peninsula.

If such pollutants were eliminated, Torch Lake, with its relatively warm water and its nearness to the Houghton-Hancock municipal area, could become an excellent source of water-oriented outdoor recreation (especially for water-contact sports) for nearby residents and visiting tourists. There is a definite scarcity of bodies of water suitable for body-contact recreation in the Keweenaw Peninsula.

With the installation of adequate treatment facilities at the communities that are polluting Torch Lake, consideration could be given to cleaning up the lake and converting it to recreational use.

Black River. There is evidence of the presence of pollutants in waters associated with the scenic Black River area in Michigan's Gogebic County. The communities of Wakefield and Bessemer, which discharge their sewage effluent into tributaries of the Black River (Planter and Kallander Creeks, respectively), reportedly have recently upgraded their treatment facilities. The town of Ramsay, which has been requested to take corrective measures, does not provide treatment of its municipal wastes which empty directly into the Black River. Despite the reported improvements in treatment facilities, odors of a sewage nature are still emitted from Kallander Creek. There have been reports of similar odors on the main stem of the Black River near the river's numerous scenic waterfalls.

In addition to the sewage problem, heavy rainfalls erode red clays that are prevalent in this locale, causing a pronounced rusty-red discoloration of Black River tributaries. Highway building and pipeline construction are contributing factors to the introduction of red clays to the river. The Black River area has been acquired by the United

States Forest Service and is presently being developed and administered as a scenic area.

Jay Cooke State Park. Some feel that large withdrawals of water from the St. Louis River by the Minnesota Power and Light Company are affecting the esthetic quality of scenic and historic Jay Cooke State Park. During most of the year this company is diverting in excess of 90 percent of the total river flow which normally would pass through Jay Cooke State Park. Any possibilities of providing fishing for park users have also been precluded by the water diversion. Pending elimination of upstream sources of pollution, a fishery of some type could conceivably be established. Although the water is now unfit for total body contact recreation because of existing upstream sources of paper wastes and sewage, the river could be a prime attraction at the park for sightseers, campers, picnickers, and hikers. The St. Louis River, which drops rapidly in elevation, has cut a deep and picturesque gorge within the park providing a series of rapids and white water during the spring high water flows. The 19,000 acre park had a 1963 visitation of 90,000 persons and in 1966 it received 197,000 visitors. Jay Cooke State Park is especially important

Plate 6-10. Diversion of the St. Louis River by the Minnesota Power and Light Company has deprived Jay Cooke State Park of an esthetically pleasing flow of water. (Photo by BOR.)

because it provides a major source of outdoor recreation for persons residing in or near the Duluth metropolitan area. Located nearby is Interstate Highway 35, a route heavily traveled by recreationists. The environment of this park, already affected by the loss of the esthetically pleasing water flow of the St. Louis River is rendered even less desirable by the presence of paper and sewage wastes made considerably more conspicuous as a result of the reduced water flow. Stagnant pools and strong odors are present on occasion. Remedial action to increase water flows through the park seems to be highly contingent upon results of a two-year study of the St. Louis River by the Federal Water Quality Administration and additional studies by the Minnesota Water Pollution Control Agency.

Other Areas. In addition to the pollution problem areas that have been discussed in this report are other areas in the basin where pollutants of a municipal, industrial, and navigational nature are suspected of affecting the recreational uses of basin waters. The majority of these affected regions are located near municipal areas. Included in this category are the small, economically poor, unincorporated villages scattered throughout the Lake Superior Basin. A considerable number of small communities, lacking any type of treatment system, are discharging raw wastes into small nearby streams. These unsightly discharges kill fish life in the streams, detract from a normally pleasant small town atmosphere, and depreciate the stream's overall recreational values.

A section of the 1965 Michigan law which amended Act 245, Public Acts of 1929, has provided the legal force necessary to correct the municipal pollution problem in this state. Section 6 states that damage due to sewage need not be proven; the discharge of raw sewage to streams is "prima facie" evidence that illegal pollution is occurring (47). The high costs of providing necessary sewage treatment facilities at small economically depressed communities have always been the primary obstacle to conversion. Monies from Michigan's 1968 $335 million pollution bonding program could provide some of these necessary funds.

Cottage or seasonal home development poses a contamination threat to both inland lakes and streams and the shoreline waters of Lake Superior. Many of these summer homes either pipe sewage directly into the lake or use septic tank systems, the contents of which infiltrate both the ground water table and surface waters. Although this problem is not as advanced in the Lake Superior Basin as it is in the other Great Lakes basins, more development of the study area, including seasonal home ownership, could further deteriorate the quality of lakes and streams to the extent that recreation activity could be seriously hindered. In order to resolve this pending problem, the seriousness of the situation must be recognized and corrective avenues explored by all concerned--planners, land developers, state and local governments, and concerned citizens. Full compliance with the provisions of such laws as Wisconsin's and Minnesota's Shoreland Management Programs and Michigan's Subdivision Control Act of 1967 could eliminate much of the problem. These laws are discussed in Chapter 7 under "Action Programs."

POLLUTION FROM NATURAL CAUSES

Throughout the Lake Superior watershed are found types of natural phenomena which affect water quality to varying degrees. For the most part, these phenomena are a result of natural erosive processes and, in the majority of cases, have limited effect on recreational uses. On occasion, however, the result may adversely affect not only esthetic quality but also the ability of the water to support recreational use.

The undesirable appearance of certain clay-laden streams in northern Wisconsin and northwestern Michigan tend to further discourage already limited swimming and swimming related activity in Lake Superior bays and protected areas. The Fish and Wildlife Service indicates that the presence of such clays create turbidity and siltation problems that adversely affect both the habitat and biological life processes of fish (108). Erosion and sedimentation cause discoloration of waters around the Apostle Islands complex, Chequamegon Bay, and the westernmost portions of Michigan's Upper Peninsula. Red Clays and the presence of certain minerals are tinting the waters to varying degrees, depending on the season and amounts of rainfall.

Natural discoloration occurs in the Tahquamenon River and its tributaries in Zone 1. This phenomenon stems from the presence of organic stains in swamp areas and imparts a dark brown color to the water. The largest of the Tahquamenon Falls exhibits this color very well, providing an exotic copper stain as it cascades over its 53-foot cataract.

The presence of a by-product from a bygone copper mining process has created an unusual shore deposit which is prevalent throughout the Keweenaw Peninsula of Michigan. A coarse ore material called "stamp sand" is found at various locations, with some of the deposits being quite extensive in range. Not considered toxic to fish and wild-

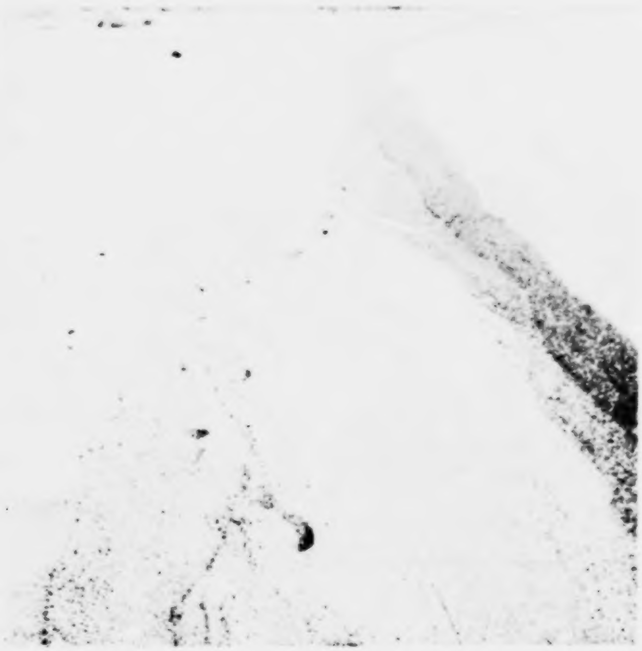


Plate 6-11. "Stamp sand," a coarse ore material from a former mining process has covered a fine grained, white, sandy beach in the Keweenaw Peninsula. (Photo by BOR.)

life, it has covered several large areas of white, fine beach sand, especially along the Keweenaw Peninsula shoreline.

There are numerous locations along the Lake Superior shoreline where wind, rain, and the pounding waves are creating turbid waters by eroding soil from the high ridges and beaches.

THERMAL POLLUTION

Thermal discharges are a special category of pollution which deserves further attention through additional research. Water temperature changes can have a significant effect on the biota (flora and fauna) of any body of water. This, in turn, can affect fish life, and, subsequently, fishing activity. The April 1969, report of the Federal Water Quality Administration, An Appraisal of Water Pollution in the Lake Superior Basin, states the following about temperature (103).

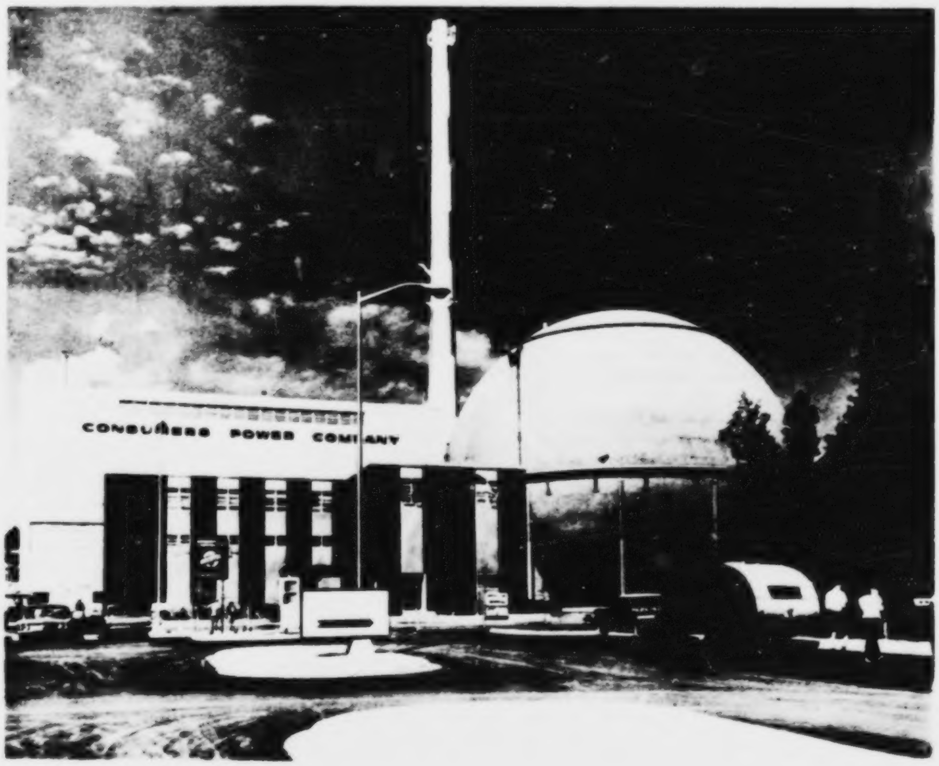
"Temperature affects all physical, chemical, and biological processes in Lake Superior. If the normal temperature regime is altered, the complete balance of the lake will be changed. An increase in temperature is known to accelerate the aging process of lakes, increase the toxicity of chemicals, lower dissolved oxygen levels, increase algal growths, disrupt delicate biological cycles, and endanger many important sensitive organisms.

"Increases in the water temperature of Lake Superior will require more stringent water quality standards for other parameters."

While increased water temperatures could be conducive to increased swimming activity, higher temperatures in conjunction with other parameters could in many areas adversely affect the use of waters for water-contact recreation activities by stimulating the growth of plankton and algae. It is possible that some locations, maintained under carefully controlled conditions, might utilize thermally affected waters for water-contact recreation.

During the summer of 1966, a series of experiments were carried out at the Douglas Point Nuclear Power Station located on the east shore of Lake Huron near Port Elgin, Ontario. The purpose of these experiments was to study the mixing of the station's cooling water discharge with the water masses of Lake Huron. Over a period of several days, the lake current underwent several changes which, one would have hoped,

Plate 6-12. A nuclear power plant located on the shores of Lake Michigan. Unless adequate precautions are taken to control thermal discharges and atomic radiation, such plants will constitute a serious threat to the ecology of the Great Lakes. (Photo by Michigan Tourist Council.)



could have enhanced mixing. Contrary to this expectation, the experiments revealed the disturbing fact that the discharge tends to be "trapped" in the shore zone of the lake for relatively long periods of time (several days) with a consequent buildup of thermal concentrations. The warmed waters merely travelled back and forth along the shore under the influence of changing winds. An analysis of the experiments resulted in a strong recommendation that further studies be carried out to bring forth a clearer understanding of the heat-exchange process (18). With several nuclear and conventional fossil-fuel power plants already existing and with other nuclear power plants planned along the shores of the Great Lakes, especially along the Lake Michigan shoreline, future recreational use of the lakes could be significantly influenced. These findings are especially significant when it is considered that the greatest threat to the biota of the Great Lakes is alteration of the ecological environment of inshore areas.

There is no question that additional research of and experimentation with artificially heated waters to determine subsequent effects on the aquatic environment are needed before any final solutions on the necessary controls of such waters can be agreed upon. Such research and experimentation should be greatly accelerated due to the considerable number of conventional (fossil-fuel) and nuclear power plants planned for construction in the near future. In the interim, some corrective method (such as the use of cooling towers, cooling ponds, or recycling) should be employed so that any environmental modification of Great Lake's waters, shoreline, and aquatic life is reduced to a minimum.

If not carefully controlled, associated radio-nucleide material of nuclear power plants pose an even more potentially dangerous threat to aquatic life and recreation users of the Great Lakes than existing fossil-fuel power plants. The utmost of precaution will need to be employed to avoid any unintentional release of radio-active material to the waters of the Great Lakes.

WATER QUALITY IMPAIRMENT

In Chapter 1 water pollution was defined as the addition of any material or any change in the quality or character of a body of water which interferes with, lessens, or destroys a desired use. Throughout the Lake Superior Basin are sources of contamination which have actually impaired the basin's waters for recreational purposes. Plate No. 6-13 shows present degrees of impairment. These degrees have been divided into three categories: light, moderate, and gross. Definitions of these follow:

WATERS LIGHTLY IMPAIRED are those which can support recreational activities involving total body as well as partial body contact. In some instances these waters may not be esthetically pleasing during part of the recreational season because of certain activities such as: mining, gravel washing, canning, sewage treatment, or similar activities which may preclude their use by some recreationists.

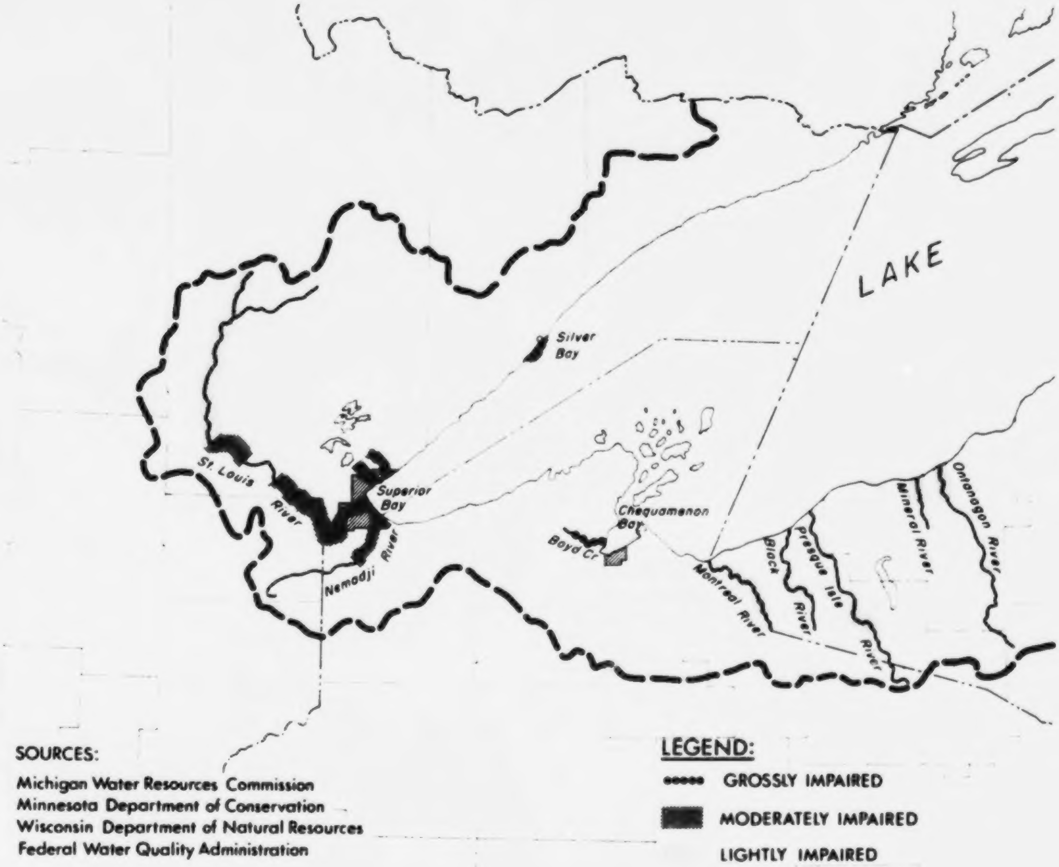
WATERS MODERATELY IMPAIRED are those at which recreational activities involving total body contact are deterred because of health considerations. Some persons might engage in water activities involving partial body contact, but most people would shy away from such activity because of esthetic impairment.

WATERS GROSSLY IMPAIRED are those at which recreation activity involving whole body contact are deterred or prohibited because of health considerations and which would be shunned by nearly all people involved in water recreational activities. Such waters would be esthetically displeasing because of algal growth, dead fish, oil slicks, floating debris, raw sewage, or other similar conditions.

PRESENT ABATEMENT PROGRAMS

Two major elements of any pollution abatement program are those of surveillance and enforcement. Surveillance of surface waters in Michigan is presently accomplished through several programs. The Michigan Department of Health requires all municipal sewage treatment plants to submit monthly records of daily operations. These are records of the volume of flow, constituent waste materials in the effluent, and the degree of treatment provided.

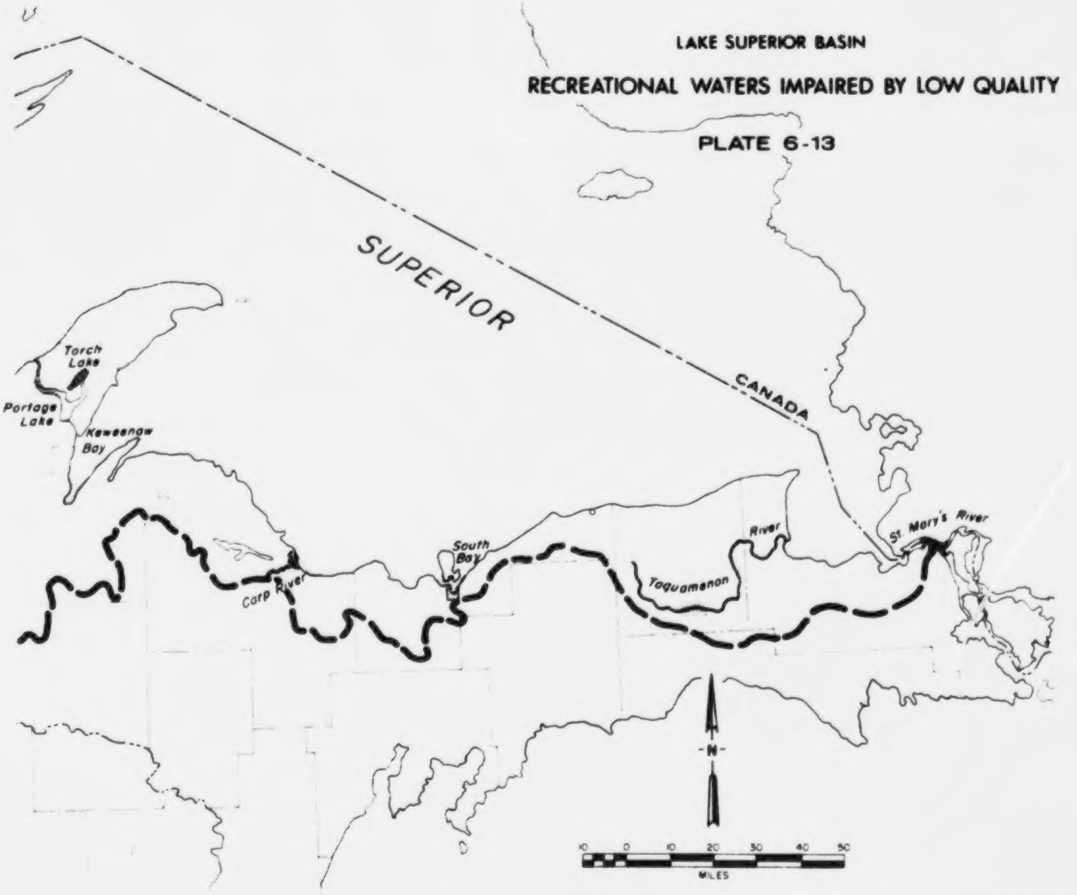
In accordance with Act 245, Public Act of 1929, as later amended, any proposed new or increased use of the surface water for industrial waste disposal must be reported to the Michigan Water Resources Commission. Each proposed new or increased use is evaluated to determine the type of restriction required to prevent pollution of the receiving waters. Industries are now being required to submit monthly reports showing effluent characteristics of new or increased effluent. Water Resources Commission personnel inspect all industries discharging wastes into surface waters at least annually.



SOURCES:
Michigan Water Resources Commission
Minnesota Department of Conservation
Wisconsin Department of Natural Resources
Federal Water Quality Administration

Small and medium plants are inspected annually while larger plants may be inspected more frequently, depending on the need. Each industry receives an annual rating as to treatment adequacy.

Industrial waste water surveys involving comprehensive studies of waste effluents of suspected noncomplying industries are conducted. Studies are being conducted to evaluate oxygen relationships in river systems with high organic loadings as well as to determine information on drought flow, bacterial quality, stream velocity, and physical channel characteristics. A substantial number of biological studies have been conducted, and others are now in progress to evaluate the effects of waste discharges upon aquatic forms of life. A sampling program was initiated during the summer of 1967 to evaluate the bacterial quality of numerous public bathing facilities located along the shores of Lake Superior and the St. Marys River. The States of Minnesota and Wisconsin utilize surveillance systems similar to those described.



LAKE SUPERIOR BASIN

RECREATIONAL WATERS IMPAIRED BY LOW QUALITY

PLATE 6-13

The establishment of interstate and intrastate water quality standards by individual states with the assistance and cooperation of the Federal Water Quality Administration is an extremely important factor affecting future outdoor recreation potential of basin waters. Wisconsin's interstate standards have been approved without any exceptions. Interstate water quality standards have been approved for Michigan with the exception of temperature criteria for the protection of fish, wildlife, and aquatic life. Pending the inclusion of a nondegradation statement* and the resolution of certain criteria in the fisheries and recreation--Class C category--Minnesota's interstate standards will be approved without exception. All three states have held hearings on intrastate waters and have now adopted intrastate water quality standards.

* A clause which states that waters whose existing quality is better than the established standards, as of the date on which such standards become effective, will be maintained at their existing high quality.

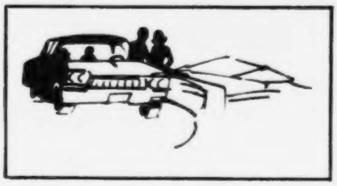
In order to meet established interstate water quality standards, many municipalities and industries in each of the three states are being required to provide secondary or equivalent treatment facilities by the year 1973 or earlier. Many small communities in the Lake Superior Basin which have been emptying raw sewage wastes into basin waters are now being ordered to stop such practices. Nevertheless, inadequate funds and problems of technical application have resulted in the continuance of such practices in some areas. Unfortunately, in the past time extensions for the installation of adequate treatment facilities have often been given to industrial plants and municipalities.

Despite the value and unprecedented nature of the recently established interstate and intrastate water quality standards, the quantitative limitations presently determined for various water quality criteria may not maintain water of sufficient quality that will provide the greatest possible environmental quality and recreational opportunity in the future. As the recreation potential of basin waters is more clearly realized and firmly recognized, it is hoped that stronger consideration will be given for recreational use of basin waters and that subsequent upgrading of water quality standards, if necessary, will be accomplished. Furthermore, it should be an established policy that degradation of waters now exceeding established water quality standards should not be allowed to occur.

The Federal Water Quality Administration at the May 1969, Lake Superior Water Pollution Enforcement Conference made specific recommendations affecting the abatement of water pollution in the Lake Superior Basin. Included were recommendations to: (1) increase the sensitivity of existing surveillance plants to changes in basin water quality; (2) provide secondary biological waste treatment at all basin municipalities by January 1973, or earlier; (3) provide continuous disinfection of all municipal waste effluent and industrial effluent not later than May 1970; (4) have municipalities provide waste treatment necessary to achieve 80 percent reduction of total phosphorus, to be accomplished by January 1973, or earlier; (5) construct separate sewers or provide other remedial action to prevent pollution from this source, to be completed by October 1977; (6) encourage unified collection systems serving contiguous urban areas; (7) discourage the proliferation of small treatment plants in contiguous urban areas and foster the replacement of septic tanks with adequate collection and treatment; (8) prohibit the dumping of polluted dredged material into Lake Superior;

(9) eliminate discharges of visible oil from any source; (10) adopt uniform state rules and regulations for controlling wastes from watercraft; and (11) have appropriate state and federal agencies develop plans to control soil erosion in the basin (103).

In addition to state surveillance and enforcement programs, the interstate and intrastate water quality standards, and the 1969 Lake Superior Water Pollution Enforcement Conference control of pollution will be affected in some measure by Michigan's 1968 Water Pollution Control Bonding Program, the Wisconsin and Minnesota Shoreland Management Programs, and the Michigan Subdivision Control Act of 1967. The Minnesota State legislature has passed the Crystal Waters Act which became effective on July 1, 1969. This Act provides additional controls of water pollution in the state. The citizens of Wisconsin have approved a bonding program which will provide $144 million for water pollution control and $56 million for outdoor recreation purposes. Each of these programs is discussed in greater detail in Chapter 7 under State Action Programs.



Chapter 7
Outdoor Recreation Plan

APPRAISAL OF RECREATION POTENTIALS

The scenic beauty and associated wilderness values of the Lake Superior Basin have been appreciated by visitors for many years, but it has been only recently that national recognition and greater state and local attention have been given to its recreation potential. Whereas public lands in excess of four million acres are available for recreational use in some form, only a small portion (5,700 acres) of these lands have been intensively developed for recreational purposes. For the Greater portion of the basin, this is probably as it should be--large acreages of undeveloped lands available to be hunted, fished, and hiked upon by those seeking solitude. On the other hand, there are portions of the basin possessing natural features unique enough to warrant facility development that will better provide the public with opportunities to observe and enjoy these areas. The establishment of Pictured Rocks National Lakeshore was accomplished to insure the future availability of its unique and outstanding scenic values for people from throughout the nation.

Several programs now under way or scheduled for the near future will significantly affect the recreation complexion of the Lake Superior Basin. Notable developments include the recently established Pictured Rocks National Lakeshore, the introduction of coho and chinook salmon and the rehabilitation of lake trout to Lake Superior waters, the purchase and development of the Sylvania Tract by the United States Forest Service, the attempt to establish an Apostle Islands National Lakeshore, and the designation of the National North Country Hiking Trail. In addition, there are other areas at which either acquisition of land or development of facilities for recreational purposes is now being contemplated.

There are other significant areas in the basin which possess natural qualities of considerable scenic, recreational or interpretive values which should be given national, state, or local development consideration. More notable areas include the Apostle Islands and associated mainland, Michigan's Huron Mountains, Wisconsin's Kakagon and Bad River sloughs, and portions of Minnesota's North Shore area.

Near these special areas lie extensive forest lands (primarily federal and state forests) ribboned with many miles of streams and dotted with many inland lakes. While much of this forest land does not possess unique natural characteristics sufficient to warrant government recognition through formal park designation, it is well suited to satisfy the urge of many to hunt, fish, camp, or hike in a semi-wilderness environment. These lands should receive only minimum development considerations such that the wild and rustic appearance characteristic of the Lake Superior Basin can be maintained to the greatest extent possible.

Plate 7-1. The wilderness nature and secluded beauty of the Huron Mountains make it one of the Lake Superior region's outstanding resource areas. Most of the area is controlled by private interests.

(Photo by National Park Service.)

Plate 7-2. The swampy environment of the Bad and Kakagon River Sloughs contrasts sharply in character with most of the terrain in the Lake Superior Basin. The sloughs present an opportunity for the interpretation of its rich and interesting ecological values. (Photo by National Park Service.)

Zone 1 - The extensive acreages of forested lands, numerous lakes and streams, the rugged Lake Superior shoreline, and the famous Tahquamenon Falls all combine to make Zone 1 a most attractive area. The zone's recreational potential is enhanced by the existence of large acreages of public lands.

The demand-supply analysis indicates a deficit of developed recreation land in Zone 1. A 60 percent reduction in the Mackinac Bridge toll rates by the State of Michigan became effective on January 1, 1969. This could increase the number of weekend visits of southern Michigan residents. Development of the Pictured Rocks National Lakeshore will help satisfy the demand for developed recreation land in Zone 1 and provide an outstanding tourist destination area.

Zone 2 - This zone also contains many acres of forested lands and numerous lakes and streams. The highly popular tourist areas of the Keweenaw Peninsula, the Apostle Islands complex, and the Porcupine Mountains State Park lie within the boundaries of Zone 2. This area is easily reached by residents of the Duluth-Superior SMSA, but is rather remote from the large SMSA's to the south. Many tourists from the Chicago-Milwaukee SMSA tend to terminate their travel in the "Land O' Lakes" region of northern Wisconsin. There will be a need to provide additional developed recreation areas in Zone II.

Zone 3 - Miles of spectacular Lake Superior shoreline are associated with Zone 3. Much of the land is under public ownership. Tourist travel is substantial during the summer months; however, much of this tourist travel is associated with destination points located outside the basin boundary. Many tourists are destined for the Boundary Waters Canoe Area adjacent to the western edge of the basin or are bound for Canada via the Great Circle Route. There are numerous state parks, scenic rest stops, motels, and tourist cabins established along U.S. Highway 61, the main route of travel.

SUPPLEMENTAL CONSIDERATIONS

Location of Recreation Facilities. The existence of outstanding natural areas and the need for additional development considerations at these locations have been discussed in other parts of this report. To adequately accommodate vacationists and tourists some portions of such areas need to receive intensive development considerations--the extent of development to correspond with expected visitations. To better satisfy recreational needs of the majority of basin residents, the development of recreation facilities should be accomplished near basin municipalities--especially near the larger cities such as Duluth, Ashland, Marquette, Sault Ste. Marie, Munising, and others.

Although intensive development should be accomplished at both types of locations (resource areas and municipal areas), the emphasis upon development in the basin should be at those areas of outstanding significance, given special federal or state recognition, where the majority of recreationists (particularly tourists and nonresident vacationists) will go.

Resource Aptitude. There are particular resource characteristics of the Lake Superior Basin which should be considered in future recreation development. Nearly the entire basin is ideally suited for low density recreation participation in hiking, primitive camping, canoeing, and fishing. The provision of intensively developed recreation lands should, however, be provided at designated national recreation areas, the more heavily visited state parks and on the periphery of the basin's larger cities such as Duluth, Superior, Marquette, and Sault Ste. Marie. Much of the public forest lands and other large holdings of undeveloped land can be best utilized and can best serve the needs of visiting recreationists by supporting those activities which require one or a combination of the following four conditions: substantial acreage per recreationist, a pleasant natural setting, fish and wildlife habitat, and privacy.

Plate 7-3. Although swimming participation in Lake Superior is modest at best, other related activities, such as swimming, beachcombing, sunbathing, gathering driftwood, and rock hunting along beaches, are popular with basin visitors. (Photo by Michigan Department of Natural Resources.)

From an esthetic standpoint, Lake Superior's greatest single asset is its scenic shoreline. The Outdoor Recreation Resources Review Commission noted in 1962: "The Great Lakes shoreline is a most pressing problem of supply. This resource is one of the most in demand, and it is one of the most scarce in public ownership. The situation is particularly acute near large cities. Less than two percent of the total shoreline is in public ownership for recreation. State and federal agencies should act promptly to preserve for public use the remaining magnificent stretches of unspoiled coastline" (62). While it is true that the percent of shoreline of Lake Superior now under public ownership is greater than that of the other Great Lakes, it also probably affords the greatest opportunity for additional public acquisition or easement control.

Lake Superior contains very cold water, a condition unsuitable for most swimmers. Because the lake itself has limited potential for swimming, development for more intensive swimming activity should be concentrated on inland lakes and bay areas where suitable, or at artificial pools. Only a few miles of publicly owned developed beaches exist in the basin. There are available, however, other large stretches of privately owned, attractive beaches. At the present time, these beaches provide recreation opportunities for considerable numbers of sightseers, sun bathers, and beachcombers, in addition to the occasional swimmer. To insure the preservation of these large privately owned scenic shorelines for future public use, federal, state, and local governments should obtain scenic easements and, in some instances, obtain outright ownership when the need justifies it.

Governmental agencies and private investors considering further development of the Lake Superior region should more strongly recognize the enormous appeal of the basin's rich Indian loré and pioneer history to vacationists and tourists. Legacies of the legendary voyageurs and French Canadian trappers, the beginnings of the nation's early iron and copper mining developments, the colorful northwoods lumbering days of the late 1800's, the commercial fishing heyday of the Scandinavian fishermen, and the Chippewa (Ojibway) Indian culture are present to be re-created and interpreted for the outdoor recreation public. Additional historical sites and interpretive centers including museums and programs would provide visitors with a greater appreciation of these important legacies.

Social Controls. Whereas rapid development of the Lake Superior Basin has not yet occurred to any significant extent and may not for some time to come, consideration should be given to protecting valuable land and water resources from incompatible development in the future. The proper use of social controls such as: (a) eminent domain, (b) easements, (c) zoning, and (d) assessment policies could help to preserve recreational qualities and enhance scenic values of the Lake Superior Basin.

In many cases, outright acquisition may be the only effective means of acquiring essential areas and key tracts, possibly requiring the injunctive power of eminent domain. The mere existence of the power of eminent domain, even without its actual use, frequently facilitates negotiated purchase.

The easement represents acquisition of rights less than full ownership. Its use allows the resource landscape to remain in its present state of development but permits the public to enjoy certain uses. Easements can be used to provide open space and buffer areas for recreation lands. Scenic easements along certain portions of major throughways and designated scenic highways are effective in preserving the natural beauty of the countryside. The use of easements along the Lake Superior shoreline would be effective in preventing any undesirable future encroachments on this scenic resource.

Plate 7-4. As pictured Rocks National Lakeshore is further developed and becomes better known, an increasing flow of tourists into the small vacation town of Grand Marais, Michigan can be anticipated. Undesirable development and commercialization around Grand Marais, which would be incompatible with the area's natural surroundings, could be avoided through the use of proper zoning. (Photo by Michigan Department of Natural Resources.)

If properly administered and used in conjunction with related controls, zoning presents an effective means of controlling land use. Zoning is an important tool which can be used to preserve areas for recreation use and at the same time permit other compatible land use practices. The present lineal development of private homes and cottages along much of the Great Lakes shoreline and basin inland lakes has not only prohibited public access in many areas but has also created an unsightly appearance of an otherwise attractive shoreline. In the future, cluster development should be encouraged wherever feasible along water frontage. The States of Wisconsin and Minnesota have enacted statewide zoning laws with the express purpose of enhancing the quality of the environment. These laws should affect favorably both existing recreation values and future outdoor recreation developments in those states. These programs are discussed in greater detail later in this chapter under State Action Programs.

Closely related to zoning are assessment policies or taxation devices. By assessing open land, such as farmland, at the value of its current use rather than at its potential value, this policy seeks to stem the spiral by which rising land assessments stimulate owners to sell to land developers, which results in additional increases in the assessment on the remaining open land.

Accessibility. Associated with recreation facility development is the provision of roadways necessary to accommodate recreational users of campgrounds, picnic areas, trails, scenic areas, and many other recreational attractions. The type of access to be provided is highly dependent upon the nature of the area itself--convenient or primitive, intensive or extensive use, modern or rustic. Many existing roadways in the Lake Superior Basin are physically suited to handle much of the recreational travel in the basin at the present time. Future trends in development, however, might alter recreational use to the extent that either additional roadways or modifications of existing highways may have to be considered. If additional developments should occur at or near such areas as the Apostle Islands or the Huron Mountains, and as the Pictured Rocks National Lakeshore becomes more renowned, the provision of better roadways to facilitate the movement of greater numbers of recreationists may become necessary.

To satisfy the growing appreciation of esthetic values it might be desirable to either improve existing or provide additional secondary backwoods roadways. Many such

Plate 7-5. Chapel Lake in the Pictured Rocks National Lakeshore. Limited access has been an important factor in retaining the primitive beauty of many Lake Superior lakes and streams.
(Photo by Michigan Department of Natural Resources.)

routes in the basin are designated as scenic roadways at the present time. Some of these existing roadways with their occasional rough going and rustic appeal pass through natural settings and satisfy what many out-of-the-way seekers want. The provision of scenic highways offering occasional views of the Lake Superior shoreline should also be considered at other locations in addition to Minnesota's North Shore area. To insure intended scenic and esthetic values of such shoreline highways and to limit undesirable commercial facility development along them, public easements stretching the length of the highway should be established.

While some areas with outstanding scenic values or with a high potential for recreation development should be made readily accessible to the recreating public: there also should be comparable areas set aside with only limited access. Some areas offering resource attractions (lakes, streams, unusual timber stands, and others) in the Lake Superior Basin warrant provision of only limited access. This planning approach will make it possible for persons seeking solitude or a sense of enjoying a relatively untouched wilderness to do so. There is little question that such out-of-the-way places retain a higher environmental quality (clearer water, less litter problems, and sometimes more fish and game) for longer periods of time than do areas receiving large numbers of visitors.

Rehabilitation of Harbors of Refuge. An area deserving of serious consideration is the provision of better equipped and perhaps additional harbors of refuge along the Lake Superior shoreline. The Lake Superior shoreline has fewer harbors of refuge to which boats must travel greater distances to reach than on the other Great Lakes. Many of these are in a deteriorating condition.

With the development of the newly established Pictured Rocks National Lakeshore, the possibility for establishment of an Apostle Islands National Lakeshore, the hopeful reestablishment of the lake trout population, and the recently enacted coho and chinook salmon stocking program in Lake Superior, boating activity should increase in Lake Superior, particularly at the above mentioned locations and in the vicinity of those streams selected for stocking of salmon. At the present time the average distance between harbors of refuge in the Lake Superior Basin is about 50 miles.

In some areas the distance is much greater than this. The Michigan State Waterways Commission has, since its creation in 1947, stated its intent to provide harbors of refuge for recreational watercraft at 40-mile intervals throughout the Great Lakes and at 15 mile intervals near areas of heavy population centers (35). The Wisconsin State Outdoor Recreation Plan stated the need for small craft refuge harbors at 15-mile intervals. The summary of an extensive study by the Wisconsin Department of Resource Development discussed a plan for small craft facility improvements which have been suggested for the Wisconsin south shore portion of Lake Superior (22).

The town of Bayfield, Wisconsin, located near the proposed Apostle Islands National Lakeshore has experienced a great decline in its once thriving commercial fishing industry. In recent years the town has established a sizeable tourist business. An increasing demand for recreational boating facilities encouraged private interests to convert its unused commercial slip into a relatively large small-craft marina (22).

Additional harbors will help to meet increased boating use; however, a significant segment of that need can be met by.the rehabilitation of deteriorated marinas presently available. The provision of adequate facilities in the Lake Superior Basin could attract more large boat operators into the area and increase the charter boat fishing operations.

Prior to lamprey predation, Grand Marais, Michigan, was a key commercial fishing and trolling port. Adequate control of the lamprey in Lake Superior and an increase in the number of lake trout, combined with the recent successful plantings of coho and chinook salmon, could once again make Grand Marais a busy port for sport fishing enthusiasts and pleasure boat users. It is now one of the most important small boat refuges along the south shore of Lake Superior and has the only protected harbor between Little Lake and Munising, a distance of over 75 miles (37, 38).

However, Grand Marais Harbor is presently in a deteriorating condition that threatens its future recreation potential. The westerly portion of this harbor is rapidly filling in with sand. The United States pile dike across the northeast portion of the bay has deteriorated to the extent that it is breeched in many places. This dike was constructed in 1898 to prevent littoral drift of sand from entering the harbor through the bay's natural entrance (37, 38).

The winds and waves sweeping in from Lake Superior have eroded away a major portion of Gull Island and all of three smaller islands plus a major portion of the peninsula between the harbor's east and west bays. Recent soundings have disclosed a loss of water depth from 30 or more feet to less than 10 feet in less than 10 years (37, 38).

Accompanying erosion is the accumulation of logs and debris from the outer lake into this protected bay. This debris is a hazard to boating. The situation is not only hazardous to the local users but also limits access to the harbor by pleasure craft. It is also suspected that the filling and scouring action of the sand accretions are damaging the bottom shoal areas and harming the fishing potential of the bay area itself (37, 38).

The U.S. Army Corps of Engineers has indicated its intent to rehabilitate portions of the east and west breakwaters, also in a deteriorating condition. The Corps does not feel, however, that reconstruction of the pile dike would significantly affect the navigation capabilities of the harbor, the primary justification that the Corps of Engineers uses for harbor construction and rehabilitation at the present time.

It should be considered the responsibility of either the state or local government, working singly or in cooperation with each other, to provide a share of funds for locally beneficial projects. In this particular case, in view of the fact that Grand Marais lies adjacent to the eastern end of Pictured Rocks National Lakeshore, perhaps a cooperative effort in planning and funding among the federal, state, and local governments could be arranged to provide a facility which would accommodate expected recreational use. In addition to grants from the Corps of Engineers, federal funds for rehabilitation and/or construction of harbors of refuge might also be obtained through the Economic Development Administration (see pages 7-20 and 7-21). Private capital, as the situation at Bayfield, Wisconsin, portrays, should not be ignored as a means of financing the construction of marine facilities.

Because of its unusual climatic conditions and physical characteristics (as discussed on pages 2-3, 4-19, and 4-22) Lake Superior is, for the most part, unsuitable for small water craft use. Any plan to meet increased recreational boating should, therefore, place emphasis on the rehabilitation of existing harbors of refuge and the construction of additional harbors of refuge to be utilized primarily by larger boats (including charter boats). The construction of any small boat marinas should be strictly limited to well protected bays and harbors.

Promotion of Tourism. Interregional competition among recreation areas is suspected of limiting tourist travel to the Lake Superior Basin. Aggressive development, more intensive promotion and advertising, and improvements in transportation have produced new patterns, creating regional competition for the tourism-recreation business. These are the findings of a report, Guidelines for Tourism-Recreation in Michigan's Upper Peninsula, dated November 1966, and prepared for the Economic Development Association by private consultants working in cooperation with Michigan State University (7).

Regions within the same time-distance radius from recreation markets are in a new competitive position. Heretofore, the natural appeals, ease of access, and the cooler climate established the habit of "going north" for those living in the prime market areas of northern Illinois, Indiana, Ohio, and lower Michigan. Now significant attractions within this same radius can be found in almost any direction (7).

Major water recreation areas have been developed in the Missouri and Arkansas Ozarks. Dams constructed at Bagnell in 1931 and at Table Rock in 1957 now impound large bodies of water that receive heavy recreational use. Here, multimillion dollar facilities provide elaborate food and lodging services, indoor swimming pools, outdoor water events, and even skiing. Many other Corps of Engineers multipurpose reservoirs are either in existence, being planned, or under construction in the States of Ohio, Indiana, and Illinois. Nearly all of these reservoirs are incorporating recreation as a principal use since the passage of Public Law 89-72 (Federal Water Project Recreation Act) in 1965.

South of the primary points of origin of Upper Peninsula tourists are the Tennessee Valley Authority and the Cumberland Valley System, which have created over 25 large fresh-water lakes. The "Land Between the Lakes," a 39-mile long peninsula between Kentucky Lake and Barkley Lake, is now undergoing major development for recreational use. New highways, lodge facilities with air conditioning, and many new services and developments make these attractions extremely appealing (7).

The publication, Guidelines for Tourism-Recreation in Michigan's Upper Peninsula, contends that these developments are tending to draw tourists away from the Lake Superior Basin. Tourism trends in the basin have shown a decline in the past few years. Despite a national rise in tourism and recreation, the industry in the Upper Peninsula has declined from $138 million in income in 1957 to $118 million in 1964 (7).

An inspection of business trends in eating and drinking establishments in Michigan's Upper Peninsula for the period 1954 to 1963 revealed only a 10 percent increase as compared to a 34 percent increase for the nation. Lodging establishment volumes in the United States rose 30 percent as compared to nine percent for the Upper Peninsula.

Nationally, in recent years it has been the larger, more complete and diverse recreation complex that has enjoyed the greatest patronage. Such complexes include a wide range of supporting services--from camping to deluxe room service, from hot dogs to gourmet dinners, plus a range of recreational activities such as dancing, bowling, archery, and golf courses. Many of these complexes were carefully planned to include local community service as well as satisfy tourism markets (7).

The report concluded that if the Upper Peninsula is going to successfully compete with the tourist-drawing complexes to the south, comparable development will have to be considered for the region.

Another study, perhaps not offering a development plan with such detail as the previously discussed report but emphasizing the promotion of tourism, The Potentials of Commercial Tourism in the Upper Great Lakes Area, revealed the following facts about the Upper Great Lakes region:

a. Existing facilities are to a large extent underfinanced and obsolescence is prevalent;
b. Low spending tourists are the norm rather than the exception;
c. Seasonality of recreation is a grave problem;
d. Low spending tourists tend to limit the wages that labor can be paid.

"The next decade through 1977 will mark a time of change that will influence the quality revolution. In 1965, the region could consider its effective market to be within 275 miles; in 1975, the radius will be 500 miles and will encompass about 103 million people (12)." The report further stated that, if the region's tourist industry is not transformed to be more competitive, many potential tourists may not come, or may not return. This report, the purpose of which was to assess tourism potential as a boon to economic development and the potential job creating function of the tourism industry, laid out a three-strategy program:

1. To upgrade tourist facilities.
    a. Extend season.
    b. Focus on efficient management.
    c. Undertake a technical assistance program by a consortium of

universities in the three States.

   d. Increase services with new quality standards.

2. Plan for year-round tourism.
   a. Stress the importance of winter sports.
   b. Combine summer and winter tourism-cluster developments or "areas of concentration."
   c. A need for investment promotion.
3. Establish a network of "Star" attractions.
   a. "Star" attractions - for the mobile tourist.
   b. Planned attractions - basis for a network - Apostle Islands, Pictured Rocks, Voyageurs, etc.
   c. Filling the gaps - ideas for new less dramatic attractions - monuments, historical areas, nature centers, etc.

Each of these reports presents recreation development plans which the authors hope will encourage the movement of tourists to the basin so that the present low economic status of the Upper Peninsula can be improved. A discussion of these reports is included here only to offer an alternative for development of the Upper Great Lakes area and is not intended to indicate preference by the Bureau of Outdoor Recreation for either recreation development plan.

This Bureau recognizes that any recreation plan promoting tourism will undoubtedly encounter a problem in avoiding environmental deterioration and in maintaining the natural wilderness character of portions of the Upper Great Lakes area. While such a plan does have possibilities for success, its primary purpose is to improve economic and social conditions through the promotion of tourism. Any increases in number of tourists will exert additional pressures on existing and future resource facilities. Large numbers of tourists and high use pressures can ultimately modify the character of an area to the extent that the very thing that now appeals to the recreation user is lost. This could be particularly true in the case of the Lake Superior Basin with its presently appreciated natural scenic values. To insure that the rustic esthetic quality of the basin is retained, careful measures would have to be employed to restrain any overdevelopment and commercialization associated with the implementation of such a plan.

Private Outdoor Recreation Sector. Private involvement in provision of outdoor recreation facilities is considerably less in the Lake Superior Basin than in the other Great Lakes Basins for several reasons. An economically poor resident population, a cool, abbreviated summer tourist season, and the remoteness of the basin from population centers are factors not conducive to private investment. Although the bulk of recreation activity occurs during the summer season, there are indications of increasing numbers of persons visiting the basin during other times of the year.

There was a time when people dependent on the tourist trade in many northern vacation communities were engaged in more mundane pursuits for nine months of the year. Increasing interest in most outdoor recreation activities and a greater awareness of esthetic beauty have since changed this to a degree. The increasing desire of many to ski, and more recently to own a snowmobile, in conjunction with the development of private ski facilities and the establishment of snowmobile trails, has caused greater participation in these activities during the winter months. An ever-increasing appreciation for outdoor beauty and natural surroundings is further encouraging persons to travel to the Upper Great Lakes region during the spring and autumn as well as during the traditional three month summer vacation period. The lure of autumn hues has been especially magnetic to many travelers. Similarly, additional attention to such activities as canoeing, mushroom picking, and rock hunting is drawing additional numbers of persons to the northern Great Lakes area during the spring and fall months.

Such developments as the Pictured Rocks National Lakeshore will offer the opportunity for additional persons to invest in lodging and restaurant facilities, as well as sport and souvenir shops, canoe liveries, and rock shops.

There are significant problems facing the private outdoor recreation operator in the Lake Superior Basin. A section in Chapter 7 of the report, Water Oriented Outdoor Recreation - Lake Huron Basin, discusses some of the obstacles confronting the private sector in the Great Lakes region (97). Most of these same problems are also prevalent in the Lake Superior Basin. Of particular significance is the need for additional sources of financial assistance: lending institutions are very reluctant to provide loans to private operators for initial investment or future additions or modifications. In many instances, interested investors are either unaware of existing assistance programs or do not know proper procedures to take in obtaining available technical advice or existing financial aid.

A study entitled, The Tourist Overnight Accommodation Industry in Wisconsin, discussed the problems facing small resort owners in northern Wisconsin. This study revealed that many commercial facilities for tourists, vacationers, and other transients are in a run-down condition. A significant portion of the facilities have not been maintained properly and show their age to the extent that they do not appeal to the visitor. Ownership, on the other hand, appears to be much more recently acquired. The new owner probably invests most of his ready funds in buying the facility and then depends on current revenue to finance improvements. In many cases, such revenue is not forthcoming. Difficulty in obtaining financial credit to accomplish necessary improvements makes the situation nearly impossible. In cases where capital improvements are accomplished, additional taxes are imposed on the operator, adding to his other existing woes (21).

This study also indicated that many persons entering the resort business do so with intentions of living in a semi-retirement state, engaged in a non-too preoccupied pastime, while maintaining an adequate means of income in their later years. Many discover, too late, the hard work and hazards involved in operating an outdoor recreation enterprise.

Litter Control. Litter has to be recognized and dealt with as an environmental problem affecting land and water resource use and esthetic value. It is a problem that exists in every federal, state, and local park and has to be reckoned with at all of the basin's recreation areas. It is generally true that those parks receiving the heaviest use--primarily the larger, more popular state parks or those parks nearest metropolitan areas--require the largest cleanup operations. However, certain semi-primitive wilderness areas also require special care in handling litter and waste problems. A peculiar type of problem exists in the Boundary Waters Canoe Area, adjacent to the Lake Superior North Shore region. Although considered a remote wilderness area, the tendency of canoeists to follow main routes and congest in popular camping locations has caused large amounts of refuse to accumulate. The U. S. Forest Service has spent much time and effort in moving garbage and litter great distances for proper disposal. Litter problems of the type existing in the Boundary Waters Canoe Area can be expected to occur at Sylvania and any similar type areas that are opened to the public for recreational use. In addition to the provision of appropriately placed refuse receptacles, there is a need to adopt other solutions which will alleviate litter problems

Plate 7-6. Carelessness or an indifferent attitude on the part of those persons visiting areas of scenic surroundings can mar the same natural beauty they seek. (Photo by U. S. Forest Service.)

on publicly used areas. These solutions include: education of the public (at an early age), the exclusive use of cans that are subject to chemical breakdown, the imposition of higher bottle deposits with the concurrent elimination of the throw-away bottle, and more strict enforcement measures.

Incompatibility of Recreational Use. Compared to the other Great Lakes Basins, conflicts among various recreation activities in the Lake Superior Basin are thus far minimal. Any possibilities of future conflicts of recreational interests are small and will remain so, provided responsible managing agencies properly segregate activities on recreation lands. With the large acreages of publicly owned land, it is possible to apportion substantial land for activity use, including adequate buffer area to separate activities.

In light of its unparalleled growth in popularity and extensive mobility, the snowmobile poses a resource problem in the Lake Superior Basin, probably more so because of its effect on the forest environment than because of its effect on other outdoor activities. Snowmobiling occurs at the time of year when participation in other activities is at a minimum. This tends to limit confrontations between snowmobilers and other recreationists. However, snowmobiles are known to be harmful to plant life (shrubs, saplings, and grasses) and some forms of wildlife and may, in some instances, create disturbing noises for nearby hunters, nature seekers, and hikers.

Designated snowmobile trails and areas, a snowmobile code of rules and ethics, and responsible organized snowmobile clubs can aid in alleviating future problems. An International Snowmobile Conference including many state and federal resource managing agencies held in May 1969, and again in January 1970, adopted specific recommendations for snowmobile trail design, location, and support facilities as well as a standard trail sign system.

Increasing numbers of private areas being opened to snowmobiling could alleviate environmental problems and conflicts between snowmobile operators and other recreationists on public lands.

Limitation of International Boundary. Since this report considers only the United States portion of the Lake Superior Basin, the relationship to the Canadian portion of the basin was not explored. A substantial number of Canadian residents use United States recreation facilities and vice versa. Indications are that the international boundary is not a hindrance to tourists that enjoy the natural resources of the neighboring country. The existence of the political boundary, however, tends to handicap natural resource planning efforts. A similar study for the Canadian portion of the basin would give a complete overview of water-oriented outdoor recreation in the Lake Superior Basin.

ACTION PROGRAMS

Federal, state, and local governments have encouraged legislation and programs designed to correct the wanton depredation of valuable natural resources and to provide through these resources an environment capable of supporting the recreational opportunities demanded by the public. The effects of some of these programs are mentioned in other portions of this report. The influence which each program will exert on the basin will vary, depending on its applicability to the region and the decisions of responsible agencies in utilizing it. A summary of the more important legislation and action programs is listed:

Federal.

Outdoor Recreation Programs - The Land and Water Conservation Fund Act of 1965 authorizes 50 percent matching grants to states and their political subdivisions for planning, acquisition, and development of outdoor recreation resources. Acquisition and development assistance is available for state and local projects which are in accord with a state's comprehensive outdoor recreation plan. This program is administered by the Bureau of Outdoor Recreation.

Anti-Pollution Program - Under provisions of the Water Quality Act of 1965, each state in the Lake Superior Basin has adopted water quality standards for its interstate waters. Under this act, the Federal Water Quality Administration is authorized to provide financial assistance to states and municipalities for the prevention, control, and abatement of water pollution through: (1) grants for construction of sewage treatment works of up to 30 percent of eligible project costs (If states provide sufficient matching funds and the project is contained in a regional planning agencies plan, the federal share may be increased to 55 percent) and (2) grants of up to 75 percent of the total cost of facilities which will demonstrate new or improved methods for controlling discharge of waste from storm sewers or combined storm and sanitary sewers. To qualify, such projects must be approved by the appropriate state water pollution control agency.

On November 3, 1966, the Clean Water Restoration Act was enacted. This act provides grants to states for developing a comprehensive pollution control and abatement plan for a basin. Also, certain portions of the Federal Water Pollution Control Act of 1965 were amended which pertained to construction grants to municipalities for sewage treatment plants. Two studies will be made under the provisions of this act: (1) a watercraft pollution study, and (2) a study of incentive assistance to industries. Research facilities in the Great Lakes region include the National Water Quality Laboratory at Duluth, Minnesota.

Economic Development Administration - The purpose of the Public Works and Economic Development Act of 1965 is to improve areas that have poor economic conditions, including underemployment, through the creation of public works programs and the encouragement of private investment. The Economic Development Administration supports funding up to 80 percent for such facilities in eligible depressed areas. The entire Lake Superior Basin lies within the EDA area of eligibility, and Land and Water Conservation monies of the Bureau of Outdoor Recreation have been supplemented by a number of EDA grants to fund park and outdoor recreation projects in the basin.

Fish and Wildlife Programs - The Dingell-Johnson program helps states to develop sports fishing resources with funds derived from a 10 percent manufacturer's excise tax on fishing equipment. The federal funds allocated from this program are matched by 25 percent state funds.

Under the Pittman-Robertson program, states receive grants for improving and restoring wildlife habitat. The revenue from these grants is derived from the proceeds of an 11 percent manufacturer's excise tax on sporting arms and ammunition. These funds also are matched by 25 percent funds from the state. These programs are administered by the Department of the Interior's Bureau of Sport Fisheries and Wildlife.

Water Resource Development Program - The Federal Water Project Recreation Act of 1965 (Public Law 89-72) establishes procedures whereby recreation can be included as a purpose in federal water development projects. Usually nonfederal public bodies must share the cost of providing recreation lands and facilities and agree to operate and maintain them. However, nonfederal cost sharing and recreation administration of federal reservoir projects are not required in all instances. The alternative is federal administration, either as a part of a national program or the development of basic facilities to protect public health and safety.

Agricultural Programs - Under the provisions of Public Law 566, the Watershed Protection and Flood Prevention (Small Watershed) Act of 1954, as amended by the Food and Agriculture Act of 1962, the Department of Agriculture may share with state and local agencies up to half the cost of land, easements, and rights-of-way for reservoirs and other areas to be managed by state or local sponsors for public recreation. Cost sharing is also available for developing facilities needed for recreation. A small watershed must be less than 250,000 acres.

Under Section 101 of the Food and Agriculture Act of 1962, the Department of Agriculture can enter into long-term agreements with farmers to convert land regularly used for crop production into recreation projects. Title IV of the Agricultural Act of 1962 permits the Farmers Home Administration (FHA) to make loans to individual farmers for development of income-producing outdoor recreation enterprises. The FHA may also make loans up to $500,000 to nonprofit associations and insure loans up to $1 million for effecting changes in land use, including the development of recreation facilities.

Under Title VI of the Food and Agriculture Act of 1965, the Department of Agriculture can enter into long-term agreements with farmers to convert land regularly used for crop production to practices or uses that will conserve soil, water, and/or forest resources; to establish, protect, and/or conserve open spaces, natural beauty, wildlife habitat, and recreational resources; and/or to prevent air and water pollution. The Department of Agriculture is also authorized to make grants to all levels of government for the acquisition of cropland to preserve open spaces and natural beauty, to develop wildlife habitat and recreational facilities, and for the prevention of air and water pollution. The Department of Agriculture also cost shares with farmers to control sedimentation of streams, lakes, and ponds, and for improvement of wildlife habitat.

Urban Beautification and Improvement Programs- Under Title IX of the Housing and Urban Development Act of 1965, grants may be made to states and local public bodies to assist in carrying out local programs of urban beautification and improvement.

The National Wild and Scenic Rivers System- The National Wild and Scenic Rivers System was enacted by law on October 2, 1968. This law states, "It is hereby declared to be the policy of the United States that certain selected rivers of the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." The law has designated three categories of rivers: (1) wild river areas, (2) scenic river areas, and (3) recreational river areas. The act designated certain rivers as components of the National Wild and Scenic Rivers System and also named other rivers for potential addition to the system. The act calls for close federal and state cooperation in the selection of and planning for particular river areas, including a determination of the degree to which a state or political

Plate 7-7. The Bois Brule River has been designated as a scenic river by the State of Wisconsin. A number of other streams in the basin possess similar characteristics that could qualify them as wild, scenic, or recreational rivers--either at the national or state level. (Photo by Wisconsin Department of Natural Resources.)

subdivision might participate in the preservation and administration of rivers named to the national system. Furthermore, the Secretary of the Interior shall encourage and assist the various states in the establishment of state and local wild, scenic, and recreational river areas. To the present time, none of the rivers in the Lake Superior Basin have been designated by Congress for addition to the national system. The State of Minnesota has named the St. Louis and Cloquet Rivers as possible additions to a system of scenic rivers. Wisconsin has designated the Bois Brule River as a probable state scenic river in addition to recognizing its potential for inclusion in the national system. The State of Michigan has recently named several rivers lying within the Lake Superior Basin as potential national or state scenic rivers. These are the Tahquamenon and Two Hearted Rivers in Zone 1 and the Black, Ontonagon, and Presque Isle Rivers in Zone 2.

The National Trails System - The National Trails System Act of October 1968, states, "In order to provide for the ever increasing outdoor recreation needs of an expanding population and in order to promote public access to, travel within, and enjoyment and appreciation of the open air and outdoor areas of the nation, trails should be established (a) primarily, near the urban areas of the nation, and (b) secondarily, within established scenic areas more remotely located." This act prescribes the methods by which and standards according to which components of the national system of trails may be established. The Appalachian Trail and the Pacific Crest Trail were designated as initial components of the system. The act provides for three categories of trails: (a) national recreation trails, (b) national scenic trails, and (c) connecting or side trails of national, scenic or recreation trails. The act contains a provision for the additional studies of other proposed trails. Included in this list was the North Country Trail. This proposed trail, approximately 3,200 miles in length, will pass through nearly the entire east-west expanse of the Lake Superior Basin. There are provisions in the act for cooperation with the states and other political subdivisions pertaining to the development and administration of portions of such trails which are located outside the boundaries of federally administered areas. The Secretary of the Interior has been directed to encourage states, other political subdivisions, and private interests to establish scenic and recreational trails to complement the national system.

Nationwide System of Estuarine Areas - Public Law 90-454 was enacted to authorize the Secretary of the Interior, in cooperation with the States, to conduct an inventory and study of the nation's estuaries and their natural resources. This act states that Congress finds and declares that many estuaries in the United States are rich in a variety of natural, commercial, and other resources, including environmental natural beauty, and are of immediate and potential value to the present and future generations of Americans. The purpose of this act is to provide a means for considering the need to protect, conserve, and restore these estuaries in a manner that adequately and reasonably maintains a balance between the national need for such protection in the interest of conserving the natural resources and natural beauty of the nation and the need to develop these estuaries to further the growth and development of the nation. The act calls for a report to be submitted by the Secretary of the Interior, not later than January 1970, to the Congress to include recommendations on the feasibility and desirability of establishing a nationwide system of estuarine areas: the terms, conditions, and authorities to govern such system; and the designation and acquisition of any specific estuarine areas of national significance which might be acquired by the United States. Land and water areas of the Great Lakes are to be considered, as well as coastal marshlands, bays, sounds, seaward areas, and lagoons of the ocean shorelines. There are areas along the Lake Superior shoreline that should qualify for consideration under the authority and purposes of this act. Especially significant are the Kakagon and Bad River sloughs of northern Wisconsin.

National Lake Areas System- There have been efforts in the past to establish a National Lake Areas System for purposes of preserving, protecting, developing, restoring, and making more accessible certain lakes of the nation. Although an act creating a lake system has not been enacted by Congress, such a system may eventually be designated. A bill introduced in the Senate in June 1967, named certain lakes that should be given consideration. Included in the list were the Great Lakes and Lake Gogebic, the largest inland lake found in the Lake Superior Basin.

Great Lakes Levels Study - Under the direction of the International Joint Commission, the Bureau of Outdoor Recreation has completed a field survey of all Great Lakes beach areas. This survey was undertaken to determine the economic benefits which would accrue to recreational interests if lake levels were stabilized. Although analysis is incomplete, preliminary indications are that water levels control will result in less monetary recreation benefits than if they are left uncontrolled. In most cases, controlled water levels will exceed low water datum, resulting in less dry beach area (27). Furthermore, erosion of the shoreline, an esthetic factor affecting recreation, would probably still occur to about the same degree regardless of controlled water levels. The level of Lake Superior since 1953 has fluctuated within the narrow range of 2-1/2 feet as compared to a range of five feet for Lake Michigan-Huron during the same time period (74).

State.

Michigan - The Water Resources Commission of the Michigan Department of Natural Resources, in compliance with the Federal Water Quality act of 1965, has developed and had approved water quality standards for all interstate waters bordering the state. On the state's own initiative, it has also established intrastate water quality standards.

Michigan's Department of Natural Resources, in cooperation with the U.S. Fish and Wildlife Service, is engaged in a lamprey eradication program which is facilitating the establishment of anadromous fish species in Lake Superior and, hopefully, will increase the numbers of lake trout and other commercial species as well.

The various concerned agencies within the Department of Natural Resources have prepared a 10-year report for the purpose of publicizing and gaining support for their anticipated funding requirements. Some major action programs outlined in Michigan's Outdoor Future are listed below:

(1) The expenditure of $150 million in 10 years for acquisition and development of state park lands.

(2) Increased emphasis to be given the selection of additional state historical sites and the creation of a more complete program including opportunity for action on the local level.

(3) Approximately $49 million devoted to improvement of the state's fisheries.

(4) State forest development, including campgrounds, roads, access, and trails, totaling $7,050,000.

(5) Over $26 million is requested for the acquisition of game land with emphasis placed on purchases in the southern region of the state.

(6) Water access sites, marinas, harbors, and other boating facilities have received special attention because of increased interest in water-oriented activities. Funding to carry out proposed projects in the next 10 years will exceed $112 million.

(7) Under the Federal Highway Beautification Act of 1965, the Department of State Highways has projected expenditure for highway beautification and tourist facilities at $28 million during the next six years.

Preliminary studies have been made for future state and county highways to be built specifically for scenic and recreational values. The Great Lakes shoreline would receive prime emphasis. The State of Michigan, in cooperation with the U. S. Forest Service, is presently doing survey work for the construction of the Big Sea Water Scenic Highway. This highway will run along a portion of the Lake Superior shoreline and through part of the Hiawatha National Forest in Chippewa County.

In a discussion of the state's plans for outdoor recreation it was stated, "Within the next 10 years state emphasis on outdoor recreation will be devoted to the acquisition and protection of areas and shores of outstanding scenic, scientific, natural, and historic significance" (35).

The State of Michigan will undertake a 10-year conservation bonding program which will provide a total of $435 million--$335 million for water pollution control and $100 million for recreation. This program was approved in the November 1968, election. The $100 million for recreation will complement the present total capital outlay program. The goal of Michigan's water pollution program is control of pollution by 1980. This will require 210 new sewage treatment plants, improvements of 126 existing plants, and sewers for 8-1/2 million people. Plants will cost $568 million, and sewers and storm water control facilities another $641 million. Much of the cost will be borne by the federal government and local units of government. The recreation portion of the bond issue will help finance fish and game programs, forest recreation, and state park development and help fund recreation programs for local units of government.

As finally adopted, the bill splits the $100 million for recreation into three portions: (1) $30 million in direct grants to local units of government, with the Department of Natural Resources to oversee the distribution; (2) $25 million to be spent "for state recreation projects in or near urban areas for multiple-use recreation centers and outdoor recreational activities"; and (3) $45 million to be spent as follows: $24.3 million for parks, $11.7 million for fisheries, $6.3 million for wildlife, and $2.4 million for forest recreation.

A special provision for the purpose of getting the local grant program started as quickly as possible required the Department of Natural Resources to compile and submit a list of local projects by September 10, 1969. This list was to consist of projects already known to the Department. The legislature was to have 30 days to accept or reject the list, but could not change it. However, allocation of the greater portion of the $30 million in local grants was to first require an establishment of guidelines for projects. Local units were to then submit applications, which were to be reviewed and assigned priorities by the Department. Project lists will be submitted to the legislature in January and May of each year. Present plans call for an allocation of monies within a five-year period.

In addition to this bonding program, many industries are being required to upgrade their treatment systems to meet the interstate and intrastate water quality standards that have been established by the state in cooperation with the federal government.

There are two major provisions of the Michigan Subdivision Control Act of 1967 which bear an important relationship to the use of land and water for recreational purposes in that state. Part (g) of Section 105 states that the State Department of Public Health may authorize city, county, or district health departments to carry out the provisions of this act relating to suitability of soils for subdivisions not served by public water and public sewers. To determine the suitability of soils for septic systems, the Department of Public Health may require percolation tests and boring tests. If this portion of the act is given due consideration, it could aid in preventing further contamination of Great Lakes waters (69).

Other sections of the act make it necessary for any proposed residential development on flood plains to be approved in accordance with the rules of the Water Resources Commission of the Department of Natural Resources. The Commission will be given the authority to approve or reject a preliminary subdivision plat, giving the necessary reasons if rejected. This control could aid in restricting other developments on potential hunting, fishing, and general outdoor recreation lands, in addition to curbing additional pollution threats (69).

The State of Michigan has legislation pending that would establish a wild or scenic rivers program. The Michigan Outdoor Recreation Plan contains a recommendation for such a program.

Minnesota - The Omnibus Natural Resource Act of 1965 appropriates funds for the use of state agencies in the study, planning, land acquisition, and development of natural resources. It authorizes grants-in-aid to counties and municipalities to facilitate planning, land acquisition and development of natural resources; lands and facilities for recreation purposes include, but are not limited to, historic sites, archaeology, public access, parks, scenic easements, campgrounds, wildlife areas, county and school forests, and water impoundments.

At one time the State of Minnesota, under its parks and recreation policy of 1939, attempted to provide state park facilities within a 30-mile radius of every resident of the state. However, this policy was abandoned because of increased costs of establishing and maintaining such facilities. In a 1963 study entitled "Parks and Recreation in Minnesota," the Minnesota Outdoor Recreation Review Commission recommended the addition of 118,619 acres of land to the state's park system -- 59,119 acres to be added to existing parks and 59,500 acres to be acquired as new parks.

Minnesota's Governor, in his biennial budget address to the legislature in January 1969, proposed several significant environmental enhancement programs for the state. A $20 million water pollution bonding program to accelerate construction of local sewage treatment plants was authorized under the program to be voted on by the citizens of the state. This bonding proposal failed to pass, however, hindering the state's pollution control program. The Crystal Waters Act provides a fund of $1.5 million to be used by the state to reimburse municipalities for the interest costs paid on a portion of the bonds used to finance the construction of water pollution treatment works. The proposed budget also provided for a 54 percent increase in funds to expand the services of the Minnesota Pollution Control Agency in abating air and water pollution and disposing of solid waste. A $10 million bonding program was requested for acquisition of parks and open space. Lake rehabilitation and conservation education programs would be advanced under the proposals. The $33 million budget of the Conservation Department would include $400,000 for snowmobile and multiple-use trail development.

Minnesota has enacted legislation to establish a system of recreational boating rivers. In 1965, the state legislature provided money for a study of the recreation potential of certain state rivers; the study has now been completed. Present legislation does not provide for the acquisition of lands or interest in lands. The state may, through lease, cooperation, or some other arrangement, develop campgrounds and provide access to rivers. However, at the present time there is no authority to insure protection where private lands form the boundary. In addition, money has been provided for the planning and development of trails, including canoe, snowmobile, hiking, and horseback trails.

The 1969 Minnesota State Legislature enacted a Shoreland Management Program very similar to the one adopted by Wisconsin in 1966. Minnesota's program requires the adoption of county conservation ordinances by July 1, 1972. The Wisconsin Shoreland Management Program is outlined in the following section which discusses several Wisconsin programs affecting outdoor recreation.

A bill recently introduced in the Minnesota legislature provides for the establishment of a state system of natural areas. Already earmarked are $50,000 for a statewide study of potential areas. Other bills related to the abatement of water pollution and passed by the 1969 Minnesota State Legislature include: (1) amendments relating to marine toilets: (2) separate bills providing income tax and property tax relief for equipment used for pollution abatement and control; (3) the creation of a Metropolitan Sewer Board which has the responsibility for collecting, treating, and disposing of sewage in the seven county Minneapolis-St. Paul metropolitan area; (4) a solid waste bill to regulate the location and operation of solid waste sites and facilities within the seven-county metropolitan area; and (5) a bill increasing maximum penalties for misdemeanors in water pollution violations.

Wisconsin - In August 1961, the Governor of Wisconsin signed into law a 10-year, $50 million Resource Development and Outdoor Recreation Act. Wisconsin's Outdoor Recreation Act Program (ORAP) included terms calling for ". . . a long range plan for the acquisition and capital improvement of areas necessary for a statewide system of recreation facilities." Of the designated $50 million total, legislation called for an allocation of approximately:

(1) $33 million for state park and forest recreation areas,
(2) $9 million for fish and game habitat,
(3) $1 million for state aids to help metropolitan areas acquire lands,
(4) $270,000 for planning of future projects and priorities, and
(5) $50,000 for a survey of the Lake Superior region's recreation potential.

Under the Wisconsin Highway Commission scenic easement program, easements have been designated on several highways along Lake Michigan, Green Bay, and Lake Superior.

Since the original law was passed, there have been new efforts to increase and expand the benefits and goals of the ORAP. An ORAP Task Force formed by the Wisconsin Governor in 1966 made recommendations which would increase aid to local park and recreation areas and include historical site preservation and restoration and wild river preservation as separate program components. Other recommendations include an acceleration of the state surface water inventory and lake use planning and a sharp increase in the near future for development of recreation resources to protect the state's acquisition investment.

The Wisconsin State legislature authorized an Outdoor Recreation and Water Pollution Referendum to be voted on by the residents of Wisconsin in April 1969. This referendum was approved, and the bond program will now provide $144 million for water pollution control and $56 million for outdoor recreation purposes. This will provide monies beyond that authorized by the ORAP.

The State of Wisconsin enacted legislation in 1965 to establish a state system of scenic and wild rivers. The law does not provide funds necessary for the acquisition of lands or interest in lands to preserve these streams. However, the Department of Natural Resources, by power delegated to it by the state legislature, has authority to protect the river corridors and to insure public access. A bonding program, if passed, will provide $1.3 million over a 13-year period to acquire land to preserve and protect designated scenic and wild rivers. Rivers in Wisconsin which are receiving consideration as scenic or wild rivers either at the federal or state level are the Namekagon, Wolf, St. Croix, Bois Brule, Flambeau, Pike, Pine, and Popple. The Bois Brule River is located in the easternmost portion of Zone 3 of the Lake Superior Basin. Chapter 31.30 of the Wisconsin statutes prohibits the construction of dams on this river, a highly desirable feature for any river being considered for wild or scenic river status.

In 1966 the State of Wisconsin enacted a bold and imaginative law (the Wisconsin Shoreland Management Program) to protect the clear waters and natural beauty of its rural shorelands. Shorelands, as defined by the law, are lands within 1,000 feet of a lake, pond, or flowage and lands within 300 feet of a river or stream or the landward side of the floodplain, whichever distance is greater. The stated purpose of the statute is to ". . . further the maintenance of safe and healthful conditions; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structures, and land uses; and preserve shore cover and natural beauty" (120, 123). This law should have a favorable effect on the state's outdoor recreation resource by enhancing esthetic values and natural beauty and by preserving or improving the water quality of certain bodies of water in the state.

The law required special county zoning for the unincorporated shorelands of all navigable waters to have been adopted by ordinance by January 1, 1968. The law applies to most waters in the state since any water which is capable of "floating any boat, skiff, or canoe of the shallowest draft used for recreational purposes" is navigable by the Wisconsin legality test (120, 123).

Either failure of a county to adopt an ordinance or the adoption of an ordinance unacceptable to the state will result in the formulation of an ordinance for that county by the Department of Natural Resources, Division of Environmental Protection. If needed, this division is directed to provide substantial assistance to the counties (120, 123).

The law provides for zoning regulations such as: (1) determining a particular soil's suitability to support septic systems prior to the installation of such systems, (2) setting tree cutting limitations to preserve shore cover and natural beauty and to aid in controlling erosion, (3) providing minimum setback distances of various structures (including cottages) from the water's edge, (4) setting minimum lot sizes, (5) filling and grading provisions and lagooning and dredging provisions aimed at controlling erosion, and (6) utilizing subdivision controls such as cluster development (120,123).

The law will be primarily directed at those areas not yet developed and should be a useful limiting factor to the unattractive cluttering and harmful contamination of many of the state's attractive lakes and streams. Due to the practical limitations, the application of the law to the southern, more developed portions of the state will be difficult to accomplish. Through mutual agreement of lake and stream-side owners, however, perhaps some of the law's provisions can eventually be applied to bodies of water that are already unwisely developed.

It is very important that those persons most directly affected i.e., lake and streamside residents and users, gain an appreciation for what this program can achieve. This could be accomplished through a public relations program involving state and county officials and concerned property owners. Such a program could encourage cooperation and compliance, reduce objections by dissident owners, and lessen the necessity for stringent enforcement measures.

As mentioned previously, the State of Minnesota has adopted a shoreland management program which is very similar to Wisconsin's. The State of Michigan should give consideration for the passage of a similar law to protect lake and stream shorelands which are not yet intensively developed in that state.

Chapter 8
Conclusions

In consideration of all elements affecting water-oriented outdoor recreation in the Lake Superior Basin, the following conclusions are offered:

1. The Lake Superior Basin includes more than four million acres of public land (primarily undeveloped forest land) and water resources that are remotely located from large population centers. Much of these lands and waters are available to be utilized for extensive recreational use (low density) and to be developed for more intensive recreational use. In 1965 there were 5,700 acres of intensively developed land available for outdoor recreational use by the general public at 218 areas in the basin. Approximately 80 percent of these areas provide facilities for water-dependent activities.

2. The current annual recreation demand for the basin is estimated to be more than 16 million recreation days. By the year 1980 this amount is estimated to nearly double and by 2000, to increase nearly 3.5 times. Approximately 80 percent of the present demand can be attributed to vacation use--that demand for stays of three or more nights which originates primarily from persons other than local basin residents.

3. In 1964, an estimated 1.4 million vacationists came to the Lake Superior Basin for the primary purpose of outdoor recreation. It is estimated that 1.4 million vacationists would have accounted for $75 million in total tourist expenditures in the basin in 1967. The present expenditures of vacationists could be expected to be considerably more than this amount.

4. In 1965 there was a deficit of only 300 acres of developed recreation land needed to satisfy the demand for outdoor recreation in the basin. It has been estimated that there will be a need for 12,000 and 22,000 acres of additional developed recreation land by the years of 1980 and 2000, respectively.

5. The Lake Superior watershed possesses outstanding scenic qualities throughout major portions of its extent. The Lake Superior shoreline, among other basin resources, represents a significant and important recreational resource. Vast stretches of coniferous and hardwood forests; many miles of cold, fast flowing streams; numerous inland lakes; large numbers of waterfalls, river gorges, rock outcroppings, and other interesting natural features are common occurrences. These natural features have made sightseeing the primary attraction for visiting tourists.

6. In addition to state and national areas in the basin having outstanding scenic, historical, and recreational values are other areas with these same qualities which are either undeveloped or unavailable (privately owned) for general public use. Examples of the latter category are the Apostle Islands, portions of the Minnesota North Shore, and the Huron Mountains.

7. The establishment of the Pictured Rocks National Lakeshore will, through emphasis on the Lake Superior shoreline and other outstanding natural features, increase vacation use in the eastern portion of the Lake Superior Basin. A similar effect can be expected in the western portion of the basin if the Apostle Islands are also enacted as a national lakeshore. Other developments that could also affect recreational use in the Lake Superior Basin are: (1) the introduction of coho and chinook salmon into Lake Superior waters; (2) the rehabilitation of the lake trout population:(3) increased recreational use of the Sylvania Tract; (4) the eventual construction of the national North Country Trail, and (5) the large reduction in the Mackinac Bridge toll rates. These developments will encourage private investment in recreation related facilities ranging from small resorts to various souvenir shops. In addition to these developments, increases in the number of persons visiting the Lake Superior region in the future will also be contingent upon the type of management approach taken by responsible public resource managing agencies and private enterprise: i.e. will emphasis be given to high use or moderate use of recreation areas.

8. A vast wealth of pioneer history and Indian lore exists throughout much of the Lake Superior Basin. Legacies of the legendary voyageurs and French-Canadian trappers, the beginnings of the nation's early iron and copper mining developments, the colorful northwoods lumbering days of the late 1800's, the commercial fishing

heyday of the Scandinavian fishermen, and the Chippewa (Ojibway) Indian culture are present to be re-created and interpreted for the outdoor recreating public.

9. The protection and enhancement of Lake Superior's natural environment and scenic qualities can be better maintained through the use of social controls. Examples of such controls are: (a) eminent domain, (b) easements, (c) zoning, and (d) assessment policies. Outstanding examples of valuable zoning legislation are the Wisconsin and Minnesota Shoreland Management Programs. The Wisconsin Shoreland Management Program of 1966 and the more recently enacted Minnesota program were specifically conceived to enhance natural beauty and environmental quality.

10. Access to public land and water areas is an important factor in realizing greater user satisfaction of the Lake Superior Basin's resources.

a. With increasing use at recreation destination areas like the Pictured Rocks National Lakeshore and the Sylvania Recreation Area and the possibility for establishment of major recreation areas at such locations as the Apostle Islands, and portions of the Minnesota North Shore area, a need for improved and or additional highways leading to these areas may develop.

b. The designation of additional and the improvement of existing scenic highways and scenic tour routes would give visiting tourists and vacationists greater opportunity to more fully appreciate the scenic wonder of the Lake Superior region.

c. Few, and at some locations, inadequate harbor facilities exist along the entire Lake Superior South Shore area. Recent developments such as the establishment of the Pictured Rocks National Lakeshore, the introduction of coho and chinook salmon into Lake Superior waters, and the possible designation of the Apostle Islands as a national lakeshore are expected to increase recreational boating along portions of the Lake Superior shoreline. Because of its changeable climatic conditions and physical characteristics, Lake Superior is generally unsuitable for small water craft use.

d. The provision of only limited access to some areas of primitive beauty would make it possible for the recreationist that is seeking seclusion to do so.

11. Municipal and industrial pollution sources have contaminated portions of Lake Superior and its tributaries. Recreational use of these waters has either been im-

paried or limited by the presence of these pollution sources. All major sources of pollution in the basin are on waters that have established water quality standards. A water pollution enforcement conference was held during 1969 and 1970 regarding all sources of pollution in the Lake Superior Basin.

a. The St. Louis River and its tributaries in the vicinity of the Duluth-Superior SMSA, the largest and heaviest concentration of contaminated waters presently known to exist in the basin, has affected outdoor recreation and the environmental quality in that area. A principal municipal beach and several smaller beaches at Superior, Wisconsin, were closed to swimming for the period June 1961 through June 1965. This closing resulted in an estimated loss of 20,000 swimming occasions.

b. For a considerable number of years the government and the public has expressed serious concern for the dumping of large quantities of iron taconite tailings into waters near Silver Bay, Minnesota, and for its suspected harmful effects on fish and other aquatic life and on the lake's clear waters. Analysis of findings of the Federal Water Quality Administration has revealed reasons to be concerned about the effects of this discharge on the lakes aquatic life and its aging process. They have recommended that further studies be undertaken to determine the extent of the hazard. A Lake Superior Water Pollution Enforcement Conference held in Duluth, Minnesota, in 1969 recommended that the discharge of taconite tailings into Lake Superior be kept under continued surveillance with a report to be presented to enforcement conferees at six-month intervals.

c. At various locations in the Lake Superior Basin are other areas where outdoor recreational use is either being impaired or is suspected of being impaired and environmental quality is being lowered.

d. Thermal pollution and radio-active contamination each pose a possible threat to outdoor recreation values and environmental quality in the Great Lakes Basin. Results of a series of experiments in Lake Huron at Port Elgin, Ontario, in 1966 revealed the tendency of thermal discharges to build along shorelines for extended time periods. It is known that increased water temperatures do effect aquatic plant and animal life to some degree. The construction of a number of additional nuclear power plants in Lake Michigan is nearing realization. It is also expected that the numbers of conventional fossil-fuel power plants on all of the Great Lakes, including Lake Superior, will increase. These actions give reason for concern about the potential effects of thermal pollution and radio-active contamination on outdoor recreation and the natural environment.

12. The Lake Superior Water Pollution Enforcement Conference of 1969 made specific recommendations to effectuate the abatement of water pollution in the Lake Superior Basin. These recommendations set definite deadlines by which particular sewage treatment would be provided and certain detrimental practices would be prohibited.

13. Despite the unprecedented existence and value of the existing interstate and intrastate water quality standards, it should be recognized that the quantitative limitations presently set for various water quality parameters may not prove adequate in the future to maintain waters of sufficient quality that will provide the greatest possible enhancement of environmental qualities and enjoyment for the outdoor recreation public.

14. With the exception of those municipal and other inshore areas discussed in this report, the water quality of many of the basin's inland waters and most of Lake Superior's main body presently exceeds the water quality standards that have been established for the Lake Superior Basin.

"The entire Northern Great Lakes Area, with its vast inland sea, its 27,000 lakes, and thousands of streams, is a central and significant part of the fresh water assets of this country; and we must act to preserve these assets . . . I pledge you the cooperation of the Federal Government."

President John F. Kennedy
Ashland, Wisconsin
September 24, 1963

Chapter 9
Recommendations

In considering the basin's needs for outdoor recreation opportunity and the extent to which these needs may be met, it is recommended that:

1. Responsible public agencies (federal, state, and local) manage the large holdings of public land contained in the Lake Superior Basin such that existing esthetic and scenic features are maintained to the greatest extent possible. Federal, state, and local agencies should given emphasis to providing for low density experiences in such recreational activities as hiking, hunting, fishing, canoeing, camping, and nature study. In order to increase user satisfaction in the basin some areas of outstanding scenic, historical, and recreational values should be made more useable for the outdoor recreating public. This can be accomplished by providing adequate recreation facilities through more intensive development at particular locations.

2. Responsible public agencies give consideration to:

a. The acquisition and development of other areas having outstanding scenic features and potential for outdoor recreation including the Apostle Islands, the Minnesota North Shore, and Michigan's Huron Mountains.

b. The development of areas such as the Grand Portage Area of the Minnesota North Shore and the Kakagon and Bad River Sloughs in northern Wisconsin to recreate the legacy of past pioneer history and Indian lore.

3. The responsible public agencies closely cooperate among themselves and with private outdoor recreation interests in the planning, development, and management of the Lake Superior Basin so the needs of visiting recreationists and tourists are properly met and environmental quality is maintained.

4. Social controls be utilized where appropriate to help in maintaining natural beauty, environmental quality, and to enhance the values of outdoor recreation in

the Lake Superior Basin. Such controls, especially easements and zoning ordinances, should be adopted as soon as possible while the basin is still largely undeveloped. The State of Michigan should give consideration toward the adoption of a program similar to Wisconsin's and Minnesota's Shoreland Management Programs.

5. In order to improve basin accessibility and thereby increase user satisfaction of vacationists and other outdoor recreationists while maintaining environmental quality, consideration be given by federal, state, and local authorities to:

a. Construct additional and/or improve those highways leading to major recreation destination areas such as Pictured Rocks National Lakeshore, the Apostle Islands Area, and the Sylvania Recreation Area.

b. Designate additional and/or improve existing secondary roadways and scenic tour routes while maintaining a rustic backwoods appearance.

c. Improve those harbor facilities that are in a deteriorating condition and/or construct additional harbors of refuge. Any plan for rehabilitating and/or constructing additional harbor facilities should attempt to minimize any ecological effects to the Lake Superior shoreline. Because of the physical characteristics of the Lake Superior shoreline and the rapid climatic changes that occur on Lake Superior, boating facilities should be provided, only at well protected bays and harbors.

d. Provide out-of-the-way areas of primitive beauty with restricted access. This management approach will make it possible for persons to seek out areas of solitude that portray a relatively primitive, untouched quality.

6. The Federal Water Quality Administration, in cooperation with all other similarly responsible state and local water pollution control agencies, more closely examine and assess harmful effects of pollution on individual areas in the Lake Superior Basin, including those affecting or suspected of affecting outdoor recreation. Appropriate corrective methods should then be taken to eliminate or reduce such pollution.

7. The federal government and the appropriate states should continue to fully analyze any possible harmful effects resulting from the deposition of taconite tailings from the Reserve Mining Company's operation at Silver Bay, Minnesota. If it is shown that such deposition is a threat to fish and other aquatic life or affects outdoor recreation values or in any way threatens to impair the basin's environmental

quality, then immediate and appropriate, corrective measures should be taken.

8. The behavior of thermal discharges in Great Lakes waters and the possible effects that thermal discharges of both conventional and nuclear power plants might have on aquatic plants and animals be thoroughly researched with emphasis on an acceleration of such research. Conventional and nuclear power plants, in the interim, be required to provide an adequate means of cooling warmed waters (such as the use of cooling towers, cooling ponds, or recycling) before returning them to the lake. Research to determine practical and valuable uses of such thermally affected waters should be encouraged.

9. With the backing of appropriate federal and state water pollution control laws, the steps as specified in the recommendations offered by the Federal Water Quality Administration at the 1969 Lake Superior Enforcement Conference should be accomplished as a minimum within the time limits stated, and preferably sooner.

10. If future findings should indicate that present limitations on various water quality parameters are not restrictive enough to maintain the best possible water quality conditions that available technology can provide for enhancing environmental quality and outdoor recreation values, then necessary modifications to further limit quantitative values of parameters be accomplished.

11. A policy that will not permit any degradation beyond present conditions be adopted for those basin waters having a quality exceeding established water quality standards.

12. United States studies and programs aimed at better understanding and improvements of the water quality and recreation potential of the Lake Superior Basin take into consideration and be coordinated with parallel studies and programs of Canada and particularly the Province of Ontario.

Appendix A

Supply Data

Table A-1

BASIN COUNTY DATA
LAKE SUPERIOR BASIN

County	Area (sq. mi.) in County	Area (sq. mi.) in Basin	Population in County	Population in Basin	Population Density Per Square Mile in Basin
Michigan					
Gogebic	1,107	1,107	24,370	24,370	22
Ontonagon	1,316	1,316	10,584	10,584	8
Houghton	1,017	1,017	35,654	35,654	35
Keweenaw	528	528	2,417	2,417	5
Baraga	901	824	7,151	6,538	8
Iron	1,171	107	17,184	1,565	15
Marquette	1,829	1,483	56,154	45,536	31
Alger	905	574	9,250	5,866	10
Luce	906	936	7,827	7,248	9
Mackinac	1,014	16	10,853	173	11
Chippewa	1,590	1,123	32,655	23,052	21
Subtotal	12,284	8,931	214,099	163,003	18
Wisconsin					
Douglas	1,313	1,295	45,008	44,376	34
Bayfield	1,460	1,356	11,910	11,066	8
Ashland	1,038	889	17,375	14,879	17
Iron	747	670	7,830	7,027	11
Vilas	867	130	9,332	1,399	11
Subtotal	5,425	4,340	91,455	78,747	18
Minnesota					
Cook	1,346	1,346	3,377	3,377	3
Lake	2,068	1,734	13,702	11,522	7
St. Louis	6,092	5,611	231,588	213,262	38
Itasca	2,633	42	38,006	607	14
Aitkin	1,831	15	12,162	100	7
Carlton	862	665	27,932	21,573	32
Pine	1,414	27	17,004	317	12
Subtotal	16,246	9,440	343,771	250,758	27
Total	33,955	22,711	649,235	492,508	22

Sources: (83, 101, 104)

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Table A-2

SUPPLY SUMMARY
LAKE SUPERIOR BASIN

	No. Areas	No. Water Dependent	Total Land and Water Acreage	Percent of Total Acreage
ZONE 1				
Federal	7*	7	163,103	22
State	21*	18	563,863	78
Local	5*	4	184	**
Private	1	1	N/A	**
Zone 1 Totals	34	30	727,150	18***
ZONE 2				
Federal	40*	35	1,161,847	64
State	18*	16	214,688	12
Local	23*	19	440,030****	24
Private	13	11	N/A	**
Zone 2 Totals	94	81	1,816,565	44***
ZONE 3				
Federal	35*	21	699,500	45
State	20*	10	341,404	22
Local	20*	14	522,962****	33
Private	15	12	N/A	**
Zone 3 Totals	90	57	1,563,866	38***
BASIN				
Federal	82*	63	2,024,450	50
State	59*	44	1,119,955	27
Local	48*	37	963,176	23
Private	29	24	N/A	**
Basin Totals	218	168	4,107,581	100

Source: (Appendix C)

*Each developed recreation site on the federal, state, and county forests is considered a separate area; however, total acreages include all publically owned lands administered by the responsible management agencies. Privately owned lands lying within forest boundaries are not included.

**Less than one-half of one percent.

***Percent of basin total.

****Local acreage includes county forest lands in Zones 2 and 3.

Table A-3

SKI FACILITIES
LAKE SUPERIOR BASIN

Map Area	Area	Slopes	Tows	Lifts
1	Iroquis Mountain	5	2	1
2	Big Valley	na	2	na
3	Cliffs Ridge	6	2	2
4	Al Quaal Recreation Area	3	3	na
5	Mont Ripley	na	4	na
6	Porcupine Mountains	6	4	1
7	Mount Zion	4	1	na
8	Big Powderhorn Mountain	14	4	3
9	Indianhead Mountain	3	2	4
10	Mount Joy	7	1	na
11	White Cap	9	3	2
12	Mt. Telemark	10	10	4
13	Mount Ashwabay	11	5	1
14	Manitou Valley	5	4	na
15	Mont du Lac	7	4	1
16	Mt. Rockwood	3	3	na
17	Lookout Mountain	12	5	1
18	Giants Ridge	9	4	1
19	Lutsen	16	2	3
Totals		130	65	24

Sources: (45, 59, 117)

Table A-4

CANOE TRAILS
LAKE SUPERIOR BASIN

Map No. Existing	Name	Approx. No. of Canoeable Miles
1	Tahquamenon River	63
2	Two Hearted River	25
3	Sucker River	17
4	Au Train River	17
5	Otter River	50
6	Sturgeon River	35
7	Ontonagon River	245
8	Presque Isle	93
9	Black River	30
10	Bad and Marengo River	20
11	Bois Brule River	66
Total		661
Proposed		
12	Cloquet River	97
13	St. Louis River	160
14	Brule River	15
15	Pigeon River	12
Total		284

Sources: (46, 54, 118)

Table A-5

MILES OF PUBLICALLY OWNED LAKE SUPERIOR BEACH FOR MICHIGAN AND WISCONSIN*

County	Miles of Beach	Ownership
Alger	1.25	Local
Alger	2.50	State
Baraga	.06	State
Baraga	.25	Local
Chippewa	.50	State
Chippewa	2.13	Federal
Chippewa	.05	Local
Keweenaw	1.00	State
Keweenaw	.50	Local
Luce	5.17	State
Marquette	3.50	State
Marquette	.25	Local
Ontonagon	1.50	State
Ontonagon	.50	Local
Ashland	.50	Local
Bayfield	.03	Federal
Bayfield	.76	Local
Douglas	2.25	Local
Douglas	.03	State
Iron	1.00	Local
Total	24.73	

* Data for Minnesota Lake Superior Shoreline unavailable.

Source: (27)

Appendix B

Methodology

MARKET AREA DEMAND FLOWCHART

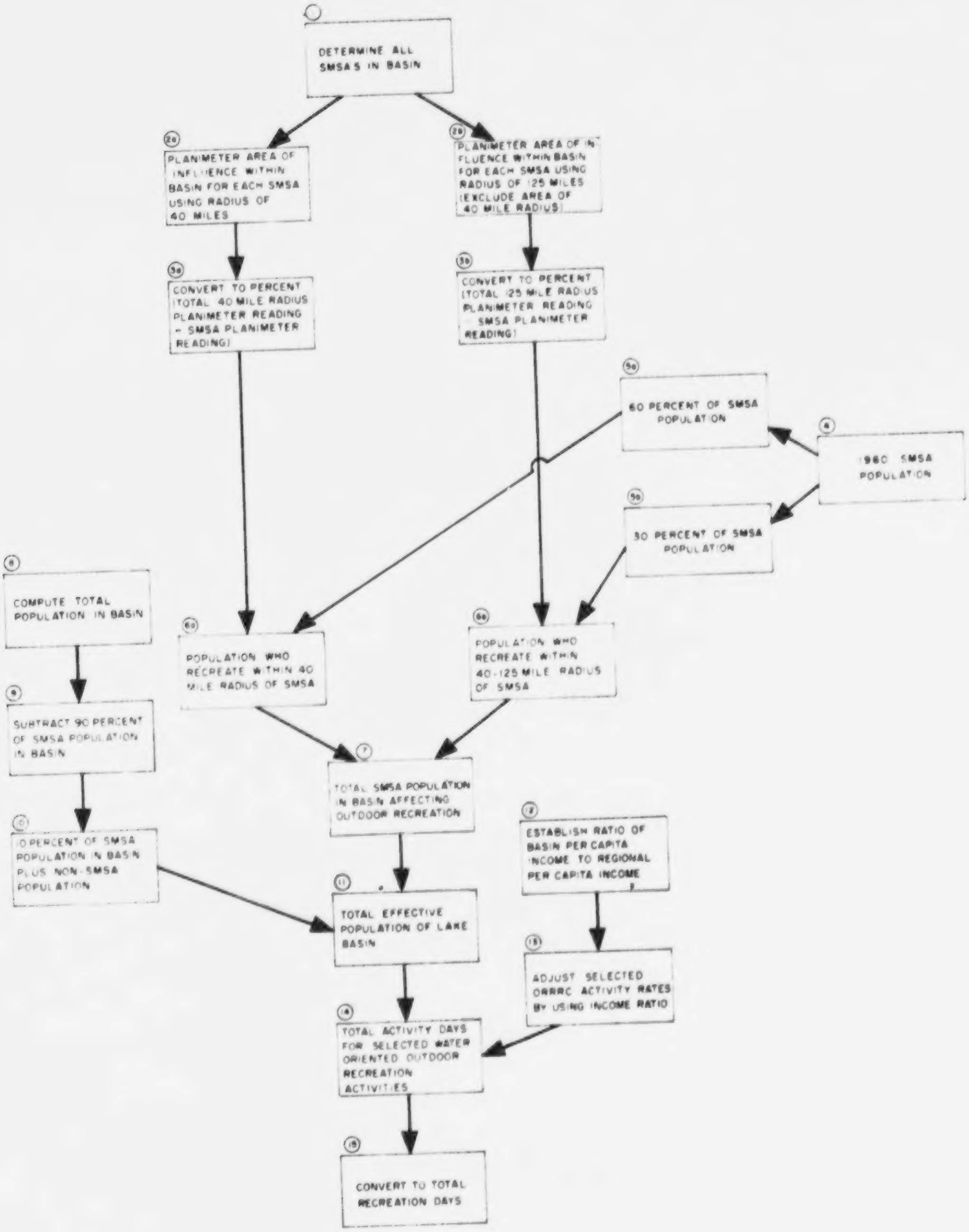
DETERMINE ALL SMSA'S IN BASIN
2a
PLANIMETER AREA OF INFLUENCE WITHIN BASIN FOR EACH SMSA USING RADIUS OF 40 MILES
2b
PLANIMETER AREA OF INFLUENCE WITHIN BASIN FOR EACH SMSA USING RADIUS OF 125 MILES (EXCLUDE AREA OF 40 MILE RADIUS)
3a
CONVERT TO PERCENT (TOTAL 40 MILE RADIUS PLANIMETER READING ÷ SMSA PLANIMETER READING)
3b
CONVERT TO PERCENT (TOTAL 125 MILE RADIUS PLANIMETER READING ÷ SMSA PLANIMETER READING)
5a
60 PERCENT OF SMSA POPULATION
4
1960 SMSA POPULATION
5b
30 PERCENT OF SMSA POPULATION
8
COMPUTE TOTAL POPULATION IN BASIN
6a
POPULATION WHO RECREATE WITHIN 40 MILE RADIUS OF SMSA
6b
POPULATION WHO RECREATE WITHIN 40-125 MILE RADIUS OF SMSA
9
SUBTRACT 90 PERCENT OF SMSA POPULATION IN BASIN
7
TOTAL SMSA POPULATION IN BASIN AFFECTING OUTDOOR RECREATION
10
10 PERCENT OF SMSA POPULATION IN BASIN PLUS NON-SMSA POPULATION
12
ESTABLISH RATIO OF BASIN PER CAPITA INCOME TO REGIONAL PER CAPITA INCOME
11
TOTAL EFFECTIVE POPULATION OF LAKE BASIN
13
ADJUST SELECTED ORRRC ACTIVITY RATES BY USING INCOME RATIO
14
TOTAL ACTIVITY DAYS FOR SELECTED WATER ORIENTED OUTDOOR RECREATION ACTIVITIES
15
CONVERT TO TOTAL RECREATION DAYS

PLATE B-1

METHODOLOGY FOR ESTIMATING DEMAND FOR RECREATIONAL OPPORTUNITIES IN THE LAKE SUPERIOR BASIN

Market Area Demand. The first step in determining the present recreation demand for the recreation market area involved calculation of the population on which to base estimates. The 1960 population of all SMSA's inside the basin, as well as those within 125 miles of the basin, was determined.

From information contained in the "California Public Outdoor Recreation Plan" (10), ORRRC report No. 4 (50), and the "Report on the Comprehensive Survey of the Water Resources of the Delaware River Basin" (91), it was concluded that:

a. Sixty percent of all recreation activity occurs within 40 miles of the participant's home.

b. Another thirty percent occurs between 40 and 125 miles of the participant's home.

c. Ten percent of all use occurs at distances greater than 125 miles.

It was also assumed that 60 percent of the recreation activity generated by the SMSA population should be satisfied within a 40-mile radius of the SMSA. This participation constituted the "day-use sector." Likewise, 30 percent of the recreation activity generated by the SMSA population would be satisfied between the 40 and 125-mile radii of the SMSA. This group of participants is termed "overnight or weekend sector." Reference is made to the flow chart, Plate B-1, on the opposite page which shows the sequential steps in deriving the modified market area demand for the day and weekend sectors. Results of this procedure are tabulated in Table B-1.

Table B-1

DEMAND FOR SELECTED WATER-ORIENTED OUTDOOR RECREATIONAL ACTIVITIES LAKE SUPERIOR BASIN, 1965

(Day and Overnight or Weekend Sector)

Activity	Adjusted Annual Participation Rate	Adjusted Summer Participation Rate	Annual Activity Occasions (thousands)	Summer Activity Occasions (thousands)
Water-dependent				
Swimming	3.58	3.10	1,519*	1,317*
Fishing	3.38	1.72	1,380**	703**
Boating	1.48	.99	628	420
Water Skiing	.18	.14	77	59
Canoeing	.08	.05	34	22
Sailing	.05	.04	22	17
Subtotal	8.75	6.04	3,660	2,538
Water-enhanced				
Camping	.44	.27	186	114
Picnicking	2.44	1.57	1,036	667
Sightseeing	4.45	1.82	1,889	773
Nature Walks	1.62	.40	688	171
Hunting	1.68	.03	685**	14**
Hiking	.23	.14	98	59
Subtotal	10.86	4.23	4,582	1,798
Winter Sports				
Skiing	.05	--	22	--
Ice Skating	.66	--	280	--
Sledding	.31	--	131	--
Subtotal	1.02		433	
TOTAL	20.63	10.27	8,675	4,336

* This figure would include all activities either associated with or closely related to beach activity, e.g., beachcombing, wading, sunbathing, rock hunting, etc.

**Based on information obtained from Bureau of Sport Fisheries and Wildlife.

Vacation Demand. The vacation demand is that portion of the demand that includes recreation visits of persons for three or more nights. It does not include the day and weekend-use sector of demand. In the Lake Superior basin, the vacation demand is especially important since it comprises approximately 80 percent of the total basin demand.

Determination of the vacation demand for the Lake Superior Basin was based on the findings of tourism studies conducted in each of the three basin states (21, 24, 41). Essentially, the determination involved the following procedure: (1) separating out that portion of the total number of tourists who visited for three or more nights in each state; (2) estimating that portion of the tourists who visited the Lake Superior Basin portion of each state; and (3) multiplying the average number of days that those tourists derived in (2) above spent in the basin portion of the study area times the number of tourists. This figure then represents the total number of vacation days that tourists spent in the Lake Superior Basin. This demand is presented in Table B-2.

Future Demand. Table B-3 on page B-7 shows future estimated participation in selected summer activities.

Zone Demands. In order to determine the recreation demand for each of the three zones, it was necessary to compute the resident demand and the vacation demand separately. For the resident demand, the total annual participation rate for the basin (Table B-1) was adjusted by an income index computed for each of the three zones. This income index is a zone-basin ratio of per capita income. Zone population estimates were multiplied by the adjusted annual participation rates for each of the zones to yield activity occasions. Since the resident basin demand figure was previously determined, each zone total is expressed as a percent of the total basin. Attendance at state parks was used as an indicator to gauge the zonal allocation for the vacation demand.

METHODOLOGY FOR ESTIMATING THE PRESENT ACREAGE DEVELOPMENT OF RECREATIONAL LANDS

The problem of adequately serving the recreational needs of the public comes into sharp focus if developed acreages are considered, rather than total public recreation land. Table B-4 provides estimates of the basin's present developed acreages

Table B-2

DEMAND FOR SELECTED WATER-ORIENTED OUTDOOR RECREATIONAL ACTIVITIES LAKE SUPERIOR BASIN, 1965

(Vacation Sector)

Activity	Percent who engaged in Outdoor Activities on vacation trips	Number of Activity Occasions (thousands)
(a) Sightseeing	51	8,197
(b) Swimming	36	5,877*
(c) Fishing	26	4,140**
(d) Picnicking	28	4,486
(e) Boating and Canoeing	18	2,938
(f) Hiking	13	2,166
(g) Camping	10	1,547
(h) Hunting	13	2,055**
(i) Nature Walks	6	928
(j) Horseback Riding	3	464
(k) Skiing and Winter Sports	1	154
(l) Took trip but did not engage in outdoor activities	22	3,403
Totals	227***	32,488****

* This figure would include all activities either associated with or closely related to beach activity, e.g., beachcombing, wading, sunbathing, rock hunting, etc.

** Based on information obtained from Bureau of Sport Fisheries and Wildlife.

*** Totals to more than 100 because vacationists participate in more than one activity per day.

**** Total does not include activities (j) and (l).

Source: ORRRC Study Report 20, Table 50, Page 50.

Note: This table was modified from the original in the ORRRC Report due to suspected greater vacation participation in hunting by basin visitors.

Table B-3

PROJECTED SUMMER (JUNE, JULY, AUGUST) PARTICIPATION IN SELECTED WATER-ORIENTED ACTIVITIES IN 2000 AND 2020 LAKE SUPERIOR BASIN

Day and Overnight or Weekend Sectors

Activity	Summer Activity Occasions for 1965 (1,000)	Summer Activity Occasion for 2000 (1,000)[2]		Summer Activity Occasion for 2020 (1,000)[3]	
		Without Opportunity	With Opportunity	Without Opportunity	With Opportunity
Water-dependent					
Swimming	1,317	2,032	2,371	2,292	2,713
Fishing[4]	703	1,800	1,800	2,545	2,545
Boating	420	664	790	748	907
Water-Skiing	59	129	153	151	182
Canoeing[5]	22	35	41	43	52
Sailing[5]	17	27	32	33	40
Subtotal	2,538	4,687	5,187	5,812	6,439
Water-enhanced					
Camping	114	201	331	236	402
Picnicking	667	747	927	800	1,021
Sightseeing	773	997	1,646	1,121	1,948
Nature Walks	171	207	207	280	280
Hunting[1]	14	24	24	28	28
Hiking	59	108	108	130	130
Subtotal	1,798	2,284	3,243	2,595	3,809
TOTAL	4,336	6,971	8,430	8,407	10,248

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[1] From Column 5, Table B-1.

[2] Projections based on data contained in Table No. 6, ORRRC 26.

[3] 2020 figures obtained by straight-line equation.

[4] Based on information obtained from Bureau of Sport Fisheries and Wildlife.

[5] Assumes same projection as boating.

by zone. In compiling data for this table, it was assumed that existing public recreation areas, except those which have been newly established, have been developed to the optimum level. From Clawson's classification of recreation lands (14), optimum development for *user-oriented* areas is considered to be 70 percent and that for *intermediate* areas is 15 percent.

Table B-4

EXISTING ACREAGES OF DEVELOPED RECREATIONAL LANDS

(Estimate in acres with adjustments)

Zones	(a) Federal	(b) State	(c) Local	(d) Private	Zone Total
1	200	571	156	33	960
2	125	1,891	337	421	2,774
3	252	859	666	161	1,938
Basin	577	3,321	1,159	615	5,672

(a) Federal - Estimated total present development - campgrounds

(b) State - Adjusted to 15 percent level of development except for less developed large wilderness type state parks (two percent used - such as Porcupine Mountains and Tahquamenon Falls State Parks).

(c) Local - Adjusted to 70 percent level of development except for some large non-intensive type use areas which were adjusted to 15 percent level of development (county and municipal parks around Duluth).

(d) Private - Assumed 70 percent development in privately owned campgrounds.

*Undeveloped and/or newly acquired lands were not tabulated, e.g., Pictured Rocks National Lakeshore.

METHODOLOGY FOR ESTIMATING ACREAGE NEEDS

Determining Present Resource Requirements. This method is based on land area per person standards as determined by personnel in the Lake Central Regional Office, Bureau of Outdoor Recreation. These standards were arrived at by compilation of existing information from many sources. They are not to be considered as official Bureau standards.

As stated on page 5-5 of Chapter 5, the acreage needs are determined in order to support anticipated visitation on those days when maximum use occurs. This was determined as follows:

12 week summer season	84 days
24 weekend days plus 2 holidays	26 days
Weekdays	58 days

Assume three weekdays of use equals one weekend day of use.
19 + 26 = 45 capacity days.

For the activities of swimming, picnicking, and boating, which are curtailed by inclement weather, assume 80 percent of capacity days will be suitable. Therefore, assume 36 capacity days for these activities. Camping and fishing participation is affected to a smaller degree by inclement weather than are the others. Therefore, the full 45 capacity days were assumed.

Land area per person standards as presented below include all development necessary to support one person engaging in the respective activity. The activities of swimming, fishing, boating, picnicking, and camping are considered since these constitute the more popular basic activities which should be provided for wherever possible. This does not mean to imply that adequate land area should not be provided for the highly important activities of hiking, nature study, and sightseeing. However, much of sightseeing and nature study occurs incidental to other activities. Hiking, on the other hand, does not require significant land area in any particular locale, and buffer areas can provide the necessary land for trails.

Hunting, of course, does not require developed land, and sufficient amounts of both public and private land are available for this activity.

Boating

Assume:
1. 3 people car and boat
2. 1,633 sq. ft. parking car and trailer incl. ramp facility
3. Turnover factor of 2

Camping

Assume:
1. 5 people party
2. 4 campsite units acre
3. Turnover factor of 1.0

Picnicking

Assume:
1. 4 people car
2. 8 picnic tables acre including parking
3. Turnover factor of 1.5

Fishing

Assume:
1. 2 people car and boat
2. 1,633 sq.ft. parking car and trailer incl. ramp facility
3. Turnover factor of 1.5

Swimming

Assume:

1. 4 people/car
2. 48 cars parking/acre (910 square ft./car of 227 sq. ft./person)
3. 100 sq. ft. beach/person
4. Turnover factor of 1.5

This information is then applied to the formula below to arrive at the necessary acreage requirements for each activity.

$$AR = \frac{D \times a}{CD \times TF \times 43,560}$$

Where AR = acreage requirement

D = demand for respective activity in summer activity days

a = area per person in square feet for respective facilities

CD = capacitydays

TF = turnover factor

43,560 = square feet per acre

The sum of the five acreage requirements yields the developed acreages necessary for the provision of adequate opportunity for these basic activities. This total is considered as the minimum acceptable amount of developed land to be provided in the basin (or zone). The existing developed acreages were subtracted from zone requirements to indicate the amount of developed land still needed (appropriately labeled "deficit") in Table 5-1.

Determining Future Resource Requirements. Except for the demand figures, the same factors employed in the present resource requirements determination were used in the future resource requirements computation. In lieu of the present demand figures, the 2000 and 2020 "with opportunity" demand figures were utilized in the future requirements calculations. The results are shown in Table 5-3 in Chapter 5.

Appendix C

Inventory of Existing Recreation Areas in Lake Superior Basin

Source: 91

FEDERAL RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	
	ZONE 1														
	Hiawatha National Forest		Lake Superior & Inland Lakes	863,103	X	X	X	X	X	X	X		X	X	N/A
F-1	Monocle Lake Campground	Chippewa	Monocle Lake	125	X	X	X	X	X	X	X		X	X	12,860
F-2	Bay View Campground	Chippewa	Lake Superior		X	X				X	X				N/A
F-3	Soldier Lake Campground	Chippewa	Soldier Lake	55	X	X	X	X	X	X	X			X	16,800
F-4	Three Lakes Campground	Chippewa	Three Lakes		X	X		X	X	X	X				N/A
F-5	Bay Furnace Campground	Alger	Lake Superior		X			X	X	X					N/A
F-6	Hovey Lake Campground	Alger	Hovey Lake		X			X		X					N/A
F-7	Au Train Lake Campground	Alger	Au Train Lake		X	X	X	X	X						N/A
	ZONE 2														
	Ottawa National Forest		Lake Superior & Inland Lakes	722,312	X	X	X	X	X	X	X		X	X	N/A
F-8	Perch Lake Campground	Iron	Perch Lake							X	X				N/A
F-9	Norway Lake Campground	Iron	Norway Lake		X	X	X	X	X	X	X				N/A
F-10	Lake Sainte Kathryn Campground	Iron	Kidney Lake		X		X	X	X	X	X				N/A
F-11	Lower Dam Campground	Houghton	E. Branch Ontonagon River		X										N/A
F-12	Tepee Lake Campground	Iron	Tepee Lake		X	X	X	X	X	X	X				N/A
F-13	Sparrow Rapids Campground	Houghton	Ontonagon River		X			X		X	X				N/A
F-14	Sturgeon River Campground	Baraga	Sturgeon River		X			X		X					N/A
F-15	Bob Lake Campground	Houghton	Bob Lake		X	X	X	X	X	X	X				N/A
F-16	Courtney Lake Campground	Ontonagon	Courtney Lake		X	X	X	X	X	X	X				N/A
F-17	Burned Dam Campground	Gogebic	Ontonagon River		X	X		X		X					N/A
F-18	Marion Lake Campground	Gogebic	Marion Lake		X	X	X	X	X	X	X				N/A
F-19	Taylor Lake Campground	Gogebic	Taylor Lake		X		X	X	X	X	X				N/A
F-20	Imp Lake Campground	Gogebic	Imp Lake		X	X	X	X	X	X	X				N/A
F-21	Paulding Pond Campground	Gogebic	Moosehead Lake		X		X	X		X	X				N/A
F-22	Robbins Pond Campground	Gogebic	Robbins Pond		X		X	X	X	X					N/A
F-23	Langford Lake Campground	Gogebic	Langford Lake		X		X	X	X	X	X				N/A
F-24	Pomeroy Lake Campground	Gogebic	Pomeroy Lake		X		X	X	X	X	X				N/A
F-25	Moosehead Lake Campground	Gogebic	Moosehead Lake		X		X	X		X	X				N/A
F-26	Bobcat Lake Campground	Gogebic	Bobcat Lake		X	X	X	X	X	X	X				N/A
F-27	Matchwood Tower Campground	Houghton													N/A
F-28	Potawatomi & Gorge Falls Scenic Area	Gogebic	Black River		X				X				X	X	N/A
F-29	Black River Harbor	Gogebic	Lake Superior		X		X	X	X						N/A
F-30	Wolf Mountain	Gogebic													N/A
F-31	Henry Lake Campground	Gogebic	Henry Lake		X		X	X		X	X				N/A
F-32	Perch River Recreation Site	Baraga	Perch River		X		X	X	X						N/A
F-33	Tanlund Lake	Ontonagon	Tanlund Lake		X			X	X						N/A
F-34	Steusser Lake Recreation Site	Ontonagon	Steusser Lake		X			X	X						N/A
	Chequamegon National Forest		Lake Superior & Inland Lakes	279,200	X	X	X	X	X	X	X		X	X	N/A
F-35	Bad River Campground	Ashland	Bad River		X			X	X				X		N/A
F-36	Potter Lake Campground	Ashland	Potter Lake		X		X	X	X						N/A
F-37	East Twin Lake Campground	Ashland	East Twin Lake		X	X	X	X	X	X					N/A
F-38	Lake Three Campground	Ashland	Lake Three		X		X	X		X					N/A
F-39	Beaver Lake Campground	Ashland	Beaver Lake		X		X	X		X			X		N/A

FEDERAL RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	1963 Visitation
	Chequamegon National Forest (Cont'd)														
F-40	Two Lakes Campground	Bayfield	Two Lakes		X		X	X		X	X		X		N A
F-41	Lake Owen Campground	Bayfield	Lake Owen		X	X	X	X	X						N A
F-42	Lake Owen Outlet Campground	Bayfield	Lake Owen		X		X	X	X						N A
F-	Drummond Lake Campground	Bayfield	Drummond Lake		X		X	X	X						N A
F-44	Wanoka Lake Campground	Bayfield	Wanoka Lake							X	X				N A
F-45	Long Lake Campground	Bayfield	Long Lake		X	X	X	X	X						N A
F-46	Mount Valhalla Recreation Site	Bayfield	WINTER SPORTS ONLY												N A
F-47	Isle Royale National Park	Keweenaw	Lake Superior	133,838	X		X	X	X	X		X	X	X	N A
	ZONE 3														
	Superior National Forest		Lake Superior and inland lakes	699,500	X	X	X	X	X	X	X		X	X	
F-48	Salo Lake Recreation Site	St. Louis	Salo Lake												N A
F-49	White Pine Recreation Site	St. Louis	None												N A
F-50	Wayside - Bassett Lake	St. Louis	Bassett Lake												N A
F-51	Cadotte Lake Campground	St. Louis	Cadotte Lake		X	X	X	X		X	X				N A
F-52	White Face Reservoir Campground	St. Louis	White Face Reservoir		X	X	X	X	X	X	X		X	X	N A
F-53	Norway Point Recreation Site	St. Louis	St. Louis River		X		X	X	X						N A
F-54	Fishermans Point Recreation Site	St. Louis	White Water Lake												N A
F-55	Wayside - Colby Lake	St. Louis	Colby Lake												N A
F-56	Dumbell Lake Campground	Lake	Dumbell Lake		X		X	X		X					N A
F-57	Hogback Lake Campground	Lake	Hogback Lake		X			X	X	X					N A
F-58	Nine Mile Campground	Cook	Nine Mile Lake		X		X	X	X	X					N A
F-59	Ox Bow Campground	Cook	Temperance River		X			X		X					N A
F-60	Temperance River Campground	Cook	Temperance River		X			X		X					N A
F-61	Poplar River Campground	Cook	Poplar River		X			X		X					N A
F-62	Pike Lake Campground	Cook	Pike Lake		X			X	X						N A
F-63	Cutface River - Wayside	Cook	Cutface River												N A
F-64	Rosebush Creek - Wayside	Cook	Rosebush Creek												N A
F-65	Grand Marais Recreation Site	Cook													N A
F-66	Kimball Lake Campground	Cook	Kimball Lake		X		X	X		X					N A
F-67	Bird Lake Recreation Site	St. Louis	Bird Lake		X			X	X						N A
F-68	Wayside - Teal Lake	Cook	Teal Lake												N A
F-69	Fort Charlotte Historical Site	Cook	Pigeon River												N A
F-70	Wayside - McFarland Lake	Cook	McFarland Lake												N A
F-71	East Bearskin Lake Campground	Cook	East Bearskin Lake		X		X	X		X	X				N A
F-72	Flour Lake Campground	Cook	Flour Lake		X		X	X		X	X				N A
F-73	Iron Lake Campground	Cook	Iron Lake		X		X	X		X					N A
F-74	Two Island Lake Campground	Cook	Two Island Lake		X		X	X		X	X				N A
F-75	Devil Track Lake Campground	Cook	Devil Track Lake		X			X		X	X				N A
F-76	Cascade River Recreation Site	Cook	Cascade River		X			X	X						N A
F-77	Lichen Lake Campground	Cook	Lichen Lake												N A
F-78	Boulder Lake Campground	Cook	Boulder Lake												N A
F-79	Crescent Lake Campground	Cook	Crescent Lake		X		X	X		X	X				N A
F-80	Baker Lake Campground	Cook	Baker Lake		X		X	X		X					N A
F-81	Sawbill Lake Campground	Cook	Sawbill Lake		X		X	X	X	X	X				N A
F-82	Grand Portage National Monument	Cook	Grand Portage Bay	770									X		sightseeing - primary [illegible]

STATE RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	
	ZONE 1														
S-1	Brimley State Park	Chippewa	Lake Superior	150	X	X	X	X	X	X			X		39,678
S-2	Tahquamenon Falls State Park	Chippewa	Lake Superior & Tahquamenon River	17,990	X	X	X	X	X	X	X	X	X	X	258,089
S-3	Paradise Campground	Chippewa	Andrus Lake												N.A.
S-4	Bodi Lake Campground	Luce	Bodi Lake		X	X		X		X					N.A.
S-5	Culhane Lake Campground	Luce	Culhane Lake		X			X		X					N.A.
S-6	Two Hearted River Campground	Luce	Two Hearted River		X			X		X					N.A.
S-7	Pike Lake Campground	Luce	Pike Lake		X	X		X							N.A.
S-8	Holland Lake Campground	Luce	Holland Lake		X	X		X							N.A.
S-9	High Bridge Campground	Luce	Two Hearted River		X			X		X					N.A.
S-10	Perch Lake Campground	Luce	Perch Lake		X	X		X		X					N.A.
S-11	Lake Superior Campground	Luce	Lake Superior		X	X									N.A.
S-12	Old Headquarters Lake Campground	Luce	Old Headquarters Lake		X	X		X		X					N.A.
S-13	Muskallonge Lake State Park	Luce	Muskallonge Lake	100	X	X	X	X	X	X			X		29,871
S-14	Reed & Green Bridge Campground	Luce	Two Hearted River		X			X		X					N.A.
S-15	Pratt Lake Campground	Luce	Pratt Lake		X	X		X		X					N.A.
S-16	Ausable Point Campground	Alger	Lake Superior		X	X				X					N.A.
S-17	Kingston Lake Campground	Alger	Kingston Lake		X	X		X		X					N.A.
S-18	Wagner Falls Scenic Area	Alger		23									X		N.A.
S-19	Ackerman Lake	Alger	Ackerman Lake	40	X		X	X							400
S-20	Au Train River Basin	Alger	Au Train River	20	X		X	X	X						1,000
S-21	Laughing Whitefish Falls Scenic Area	Alger	Laughing Whitefish River	200									X		300
	Bay de Noc State Forest	Alger		7,200	X	X	X	X	X	X			X	X	N.A.
	Grand Sable State Forest	Alger	Lake Superior	53,900	X	X	X	X	X	X			X	X	148,300
	Lake Superior State Forest	Luce	Lake Superior	432,350	X	X	X	X	X	X			X	X	243,200
	Michigamme State Forest	Marquette	Lake Superior	39,270	X	X	X	X	X	X			X	X	88,400
	Michiwabik State Forest	Houghton		3,560	X	X	X	X	X	X			X	X	N.A.
	Munuscong State Forest	Chippewa	Waiska River	28,940	X	X	X	X	X	X			X	X	109,300
	ZONE 2														
S-22	Baraga State Park	Baraga	Lake Superior	39	X	X	X	X	X	X	X	X	X	X	[illegible]
S-23	Fort Wilkins State Park	Keweenaw	Lake Superior	272	X		X	X	X	X	X	X	X	X	[illegible]
S-24	F.J. McLain State Park	Houghton	Bear Lake	340	X	X	X	X	X	X			X		97,520
S-25	Twin Lakes State Park	Houghton	Roland Lake	189	X	X	X	X	X	X			X	X	22,300
S-26	Porcupine Mountains State Park	Ontonagon	Carp River	57,810	X	X			X	X	X				[illegible]
S-27	Lake Gogebic State Park	Gogebic	Lake Gogebic	400	X	X	X	X	X	X	X		X	X	[illegible]
S-28	Potawatomi Falls Scenic Area	Gogebic		18	X	X			X						[illegible]
S-29	Dorothy Dunn Wildlife Area	Vilas	Sanborn Lake	40					X						[illegible]
S-30	Presque Isle	Vilas	Presque Isle Lake	20	X		X	X	X						[illegible]
S-31	Underwood Wildlife Area	Iron		1,602					X						[illegible]
S-32	Copper Falls State Park	Ashland	Bad River	1,480	X	X		X	X	X			X		[illegible]
S-33	White River Wildlife Area	Ashland	White River	800	X		X	X							200
S-34	Big Sioux River Conservation Area	Bayfield	Big Sioux River	80	X			X	X				X		[illegible]
S-35	Big Bay State Park Recreation Area	Ashland	Lake Superior	[illegible]	X		X		X						N.A.
S-36	Bayfield Hatchery	Bayfield	Pikes Creek	[illegible]	X	X		X					X		[illegible]

STATE RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	
	ZONE 2 (Cont'd)														
S-37	Flag River Wildlife Area	Bayfield	Flag River	600	X			X							660
S-38	White River Fish Hatchery	Bayfield	White River	2,138	X			X							N A
S-39	Drummond Lake Remnant Area	Bayfield	Drummond Lake	28	X		X	X					X		100
	Apostle Islands State Forest	Ashland	Lake Superior	16,000	X	X	X	X	X	X			X	X	N A
	Baraga State Forest	Baraga	Lake Superior	131,590	X	X	X	X	X	X			X	X	109,600
	ZONE 3														
S-40	Brule River State Forest Campground	Douglas	Bois Brule River							X	X			X	N A
S-41	Brule River State Forest Campground	Douglas	Bois Brule River							X	X			X	N A
S-42	Amnicon Falls State Park	Douglas	Amnicon River	164	X			X	X				X		N A
S-43	Pattison State Park	Douglas	Black River	1,200	X	X		X	X	X			X		245,248
S-44	Jay Cooke State Park	Carlton	St. Louis River	9,040	X			X	X	X		X			91,746
S-45	Flood Bay Wayside Park & Campground	Lake	Lake Superior	27				X	X	X	X				N A
S-46	Palisade Head Wayside Park	Lake	Lake Superior	58					X				X		N A
S-47	Gooseberry Falls State Park	Lake	Lake Superior Gooseberry River	778	X			X	X	X			X		301,511
S-48	Split Rock Wayside Park	Lake	Lake Superior	35					X				X		9,820
S-49	Split Rock Lighthouse State Park	Lake	Lake Superior												N A
S-50	Baptism River State Park	Lake	Baptism River	706	X			X	X				X		28,700
S-51	Baptism River Wayside Park	Lake	Baptism River						X						N A
S-52	Finland State Forest Campground	Lake	Baptism River					X	X	X					N A
S-53	Finland State Forest Campground	Lake	Baptism River					X	X	X					N A
S-54	Caribou Falls State Park	Cook	Caribou River	92	X			X	X				X		22,400
S-55	Temperance River State Park	Cook	Temperance River	112	X		X	X	X	X		X	X		46,372
S-56	Ray Berglund Wayside Park	Cook	Onion River, Lake Superior	46	X			X	X				X		12,180
S-57	Cascade River State Park	Cook	Cascade River	1,895	X			X	X	X	X	X	X		58,480
S-58	Kodonce River State Park	Cook	Kodonce River	128	X			X	X				X		N A
S-59	Judge C. R. Magney State Park	Cook	Arrowhead River	1,355				X	X	X	X		X		12,762
	Bear Island State Forest	St. Louis	Bear Head Lake	9,161	X	X	X	X	X	X			X	X	N A
	Brule River State Forest	Douglas	Bois Brule River	25,080	X	X	X	X	X	X			X	X	145,188
	Cloquet Valley State Forest	St. Louis	Whiteface Reservoir Boulder Lake	54,064	X	X	X	X	X	X			X	X	N A
	Finland State Forest	Lake	Lake Superior	100,726	X	X	X	X	X	X			X	X	N A
	Fond Du Lac State Forest	Carlton	Perch Lake	17,113	X			X							N A
	Grand Portage State Forest	Cook	Lake Superior	34,753	X	X	X	X	X	X			X	X	N A
	Nemadji State Forest	Carleton Pine	Nemadji River	60,215	X			X							N A
	Savanna State Forest	Aitkin	E. Savanna River	22,176	X			X							N A
	Whiteface State Forest	St. Louis	Whiteface River	2,480	X			X							N A

LOCAL RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	
	ZONE 1														
L-1	Luce-Newberry County Park	Luce	Tahquamenon River	37	X		X	X		X	X		X		7,600
L-2	Miner's Castle County Park	Alger	Lake Superior	20					X	X					79,500
L-3	Shiras Municipal Park City of Marquette	Marquette	Lake Superior	10	X	X			X						N A
L-4	Presque Isle Municipal Park City of Marquette	Marquette	Lake Superior	70	X	X	X		X						N A
L-5	Perkin's Park	Marquette	Lake Independence	47	X	X	X	X	X	X					19,882
	Gogebic County Forest	Gogebic	Montreal River	49,800	X			X	X	X			X		111,100
	ZONE 2														
L-6	Houghton Canal Twp. Park	Houghton	Portage Canal	39	X		X	X	X	X					N A
L-7	Hancock Municipal Beach	Keweenaw	Portage		X	X	X	X	X						N A
L-8	Keweenaw County Park	Keweenaw													N A
L-9	Agate Beach Park	Houghton	Lake Superior	80	X		X	X	X	X					N A
L-10	Lake Gogebic County Park	Gogebic	Lake Gogebic	134	X	X	X	X	X	X	X	X		X	N A
L-11	Ontonagon County Park	Ontonagon	Lake Gogebic	77	X	X		X	X	X					4,500
L-12	Black River Harbor Park	Gogebic	Lake Superior	215	X	X	X	X	X	X		X	X	X	300
L-13	Little Girls Point	Gogebic	Lake Superior	88	X	X			X	X	X			X	1,100
L-14	Saxon Harbor Park	Iron	Lake Superior	22	X	X	X		X	X	X				6,500
L-15	Schamberg Park	Iron	Lake Superior	160				X	X	X	X		X		12,750
L-16	Weber Lake	Iron	Alder Creek	10	X	X	X	X	X	X			X		6,500
L-17	Gil- County Park	Iron	Giles Flowage	6	X	X	X	X	X				X		10,000
L-18	Prentice Avenue Beach	Ashland	Chequamegon Bay												N A
L-19	Prentice Park Wayside	Ashland	Chequamegon Bay												N A
L-20	Un-Named County Park	Bayfield	Marengo River	80	X			X							N A
L-21	Un-Named County Park	Bayfield	Lake Branch	120	X			X							N A
L-22	Delta Lake Park	Bayfield	White River	30	X	X		X	X						N A
L-23	Un-Named County Park	Bayfield	North Fish Creek	25	X			X							N A
L-24	Un-Named County Park	Bayfield	Fish Creek	80	X			X							N A
L-25	Pike Lake Park	Bayfield	Eagle Lake	30	X	X	X	X	X	X					N A
L-26	Un-Named County Park	Bayfield	Topside Lake	80	X			X							N A
L-27	Big Rock County Park	Bayfield	Sioux River	40	X			X	X						N A
L-28	Un-Named County Park	Bayfield	Cranberry River	120	X			X							N A
	Ashland County Forest	Ashland	Galilee Lake	20,981	X	X	X	X	X	X			X		15,400
	Bayfield County Forest	Bayfield	Lake Superior	123,107	X	X	X	X	X	X			X		51,000
	Douglas County Forest	Douglas	Amnicon and Black Rivers	98,908	X	X	X	X	X	X			X		81,000
	Iron County Forest	Iron	Bad and Montreal Rivers	115,788	X	X	X	X	X	X			X		16,800
	ZONE 3														
L-29	Lake Minnisuing	Douglas	Lake Minnisuing	30	X	X		X	X		X				N A
L-30	Bardon Park	Douglas	None	80	X	X	X	X	X	X					N A
L-31	Tozer Park	Douglas	Bear Lake	40	X		X	X	X	X					N A
L-32	Billings Park	Douglas	St. Louis Bay	32		X		X	X						N A
L-33	Amity Park Forest	St. Louis City of Duluth		225	X			X	X						N A
L-34	Blackmer Park & Recreation Area	St. Louis City of Duluth		12					X						N A

LOCAL RECREATION AREAS

SITE NO.	NAME	COUNTY	ADJACENT WATER	AREA (acres)	WATER DEPENDENT	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	HIKING	NATURE STUDY	
	ZONE 3 (Cont'd)														
L-35	Chester Park & Recreation Area	St. Louis City of Duluth		60	X			X	X					X	N A
L-36	Fond du Lac Nursery	St. Louis City of Duluth		36											N A
L-37	Fond du Lac Park	St. Louis City of Duluth		576	X			X	X				X		N A
L-38	Hartley Park	St. Louis City of Duluth		453	X			X	X				X		N A
L-39	Hartley Recreation Area	St. Louis City of Duluth		10	X			X					X		N A
L-40	Indian Point Campground	St. Louis City of Duluth		26	X		X	X	X	X	X		X		N A
L-41	Lester Park	St. Louis City of Duluth		46											N A
L-42	Lincoln Park	St. Louis City of Duluth		37					X						N A
L-43	Leif Erickson Park	St. Louis City of Duluth		15	X	X	X	X	X					X	N A
L-44	Lower Chester Park	St. Louis City of Duluth		48	X			X					X		N A
L-45	Kitchi Gammy Park	St. Louis City of Duluth		153	X	X	X	X	X	X	X		X		N A
L-46	Minnesota Point Park & Recreation Area	St. Louis City of Duluth	St. Louis Bay & Lake Superior	197	X	X	X	X	X	X	X		X		N A
L-47	Minnesota Point	St. Louis City of Duluth		51	X	X		X	X	X		X		X	3,250
L-48	Grand Marais	Cook	Lake Superior						X	X					N A
	Arrowhead County Forest	St. Louis		19,510											
	Fine Lakes County Forest	St. Louis		16,313											
	Floodwood County Forest	St. Louis		93,996											
	Island Lake County Forest	St. Louis		264,407											
	Pelican Lake County Forest	St. Louis		73,680											
	Vermilion County Forest	St. Louis		35,245											
	Whiteface County Forest	St. Louis		17,684											

Appendix D

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Appendix E

Views of Other Interests

Approximately 60 copies of the preliminary draft of "Lake Superior Water-Oriented Outdoor Recreation" were sent for review to agencies concerned with the management and preservation of the Lake Superior region's resources. Following are copies of comments from responding agencies. All comments were welcomed by this office and all were given careful consideration. Many either prompted a rewording of some sections, additions to others, or in some cases warranted the deletion of certain material. We feel that in certain instances there was either a misinterpretation of the wording or a failure of the reviewer to study more closely the entire report.

In all, most comments and suggestions were constructive and well taken, and we wish to thank all who let their views and opinions be known. We feel that this report is much improved over the original draft.

It is our sincere hope that this report will provide information which will be valuable and helpful to the responsible resource managing agencies of the Lake Superior region and that such information will help in providing a quality and long remembered experience to the visitor. Most importantly, we hope this report will encourage further efforts to eliminate all sources of presently damaging pollution and all pollution sources which threaten to cause damaging effects in the future.

INDEX OF REPLIES RECEIVED

U.S. DEPARTMENT OF AGRICULTURE

- Economic Research Service
- Forest Service

U.S. DEPARTMENT OF THE ARMY

- Corps of Engineers

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

- Public Health Service

U.S. DEPARTMENT OF THE INTERIOR

- Bureau of Commercial Fisheries
- Bureau of Sport Fisheries and Wildlife
- Federal Water Quality Administration
- National Park Service

STATE OF MICHIGAN

- Department of Natural Resources, Recreation Planning Division
- Department of Natural Resources, Water Resources Commission

STATE OF MINNESOTA

- Department of Conservation, Bureau of Planning

STATE OF OHIO

- Department of Natural Resources

STATE OF WISCONSIN

- Department of Natural Resources

C
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P
Y

UNITED STATES DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE
1405 South Harrison Road
East Lansing, Michigan 48823

June 11, 1969

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
Lake Central Region
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

Thank you for the opportunity to review this draft report concerning the Lake Superior Basin.

The only substantive comments we are prepared to make concern the interpretation of demand increases in 2000 and 2020. The specific comments follow:

Page 3-7. Line 2--the figures 1.49 and 1.71 are not increases in demand. Only portions, .49 and .71, represent increases above 1960 demand.

Page 8-1. Item 2, line 2--similarly, the 1.9 and 2.2 do not wholly represent demand increases. Again, the .9 and 1.2 portions are the relevant increases.

Sincerely yours,

(Signature)
ROGER W. STROHBEHN
Leader
North Central Resource Group

C
O
P
Y

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
633 West Wisconsin Avenue
Milwaukee, Wisconsin 53203

Your Ref: D6427GL

2610

June 16, 1969

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

We appreciate the opportunity to review the preliminary draft report, "Water-Oriented Outdoor Recreation - Lake Superior Basin." The following comments are offered to strengthen or clarify an already fine report. We have listed them in the order of appearance:

Page ii - The Syllabus should stand on its own. The reader might question:

1. Duluth-Superior SMSA.
2. Zone II -- Zone III. Can these be broadly identified for this section of the report?
3. Objectives of report. State briefly.

Page III, Line 2 - Change to "--- 5,700 acres are developed for intensive recreation use," (or use wording as on page 7-1). The majority of the recreation use on National Forests is for dispersed type recreation, requiring little or no "formal" development. We think it is misleading to state that "---only 5,700 acres are developed for recreation use." Your analysis in section B (7-3) gives a more accurate picture of the present situation. Item 1, page 8-1 should also be changed to reflect site development.

Page 1-1 - How does this report relate to the Great Lakes Basin Commission?

Page 1-5, Recreation Day - Is this new terminology? We are under the impression that Visitor-Day (12 hrs.) is the "standard" reporting unit for all agencies. It is quite disturbing to note what appears to be a major deviation from this "standard," after we have made considerable effort to convert our reporting system to Visitor-Days. We recommend serious consideration be given to the recreation use reporting unit to be used in this report.

Page 2-9 - "---The biggest problem for utilizing these bodies of water is accessibility." Some mention should be made as to the quality of this type lake. We consider this lack of accessibility a definite asset for many lakes - especially the smaller ones. Intensive use on these small lakes will deteriorate their quality. There is increasing demand for areas closed to motorized vehicular use. This National Forest Region is becoming actively engaged in establishing "Back Country" type recreation--areas managed for their natural, undeveloped environment. Intensive development should be concentrated on the larger lakes, most of which are accessible.

Page 2-11 - What is "----predominately only slightly rolling,----"? Rephrase.

Page 2-11 - You refer to the Huron Mountains. We have the impression that these are located in Zone II (see page 2-2).

Page 2-15.- Source documents for projected populations should be noted.

Page 2-18 - "This indicates that lower-than-average amounts of leisure time are probably devoted to outdoor recreation." We question this statement. Perhaps the term outdoor recreation needs to be defined here, but people living in the "north country" spend considerable time in this natural environment--hunting, fishing, sightseeing, etc. They do not engage in camping, etc. at developed sites, as they have little need for this type of activity. Does "participation of basin residents in outdoor recreation----" include all forms of recreation use? For example (pg. 19) "----most of the pleasure driving is probably accomplished by tourists." Local people driving to work, or to visit friends, over these same scenic highways apparently are not considered as enjoying this type of recreation.

We feel it is incorrect to compare the vacation statistics, resource attitudes, etc. of "rural" Americans, with rural residents of this north country. They are entirely different in their participation rates, and use of natural resources.

Page 2-20 - Isn't the Rhinelander, Wisconsin airport considered an airport of consequence? It is serviced by the DC-9 jet.

Page 2-23, items c & d - Is there any conclusion that can be drawn from the data presented?

Page 2-24 - See comments for page 2-18.

Page 3-6 - The interpretation of table 3-1: Are you saying that 90% of the water-oriented recreation use occurs in the three month summer period? If so, we do not believe this is correct for the National Forests.

Page 4-1 - "Only .2 percent of these public lands is developed for recreation pursuits." Hunting and fishing account for about 50% of the recreation use to the National Forests in the Basin. Access for this use is available. Does Table A-2 include acreage of developed camp and picnic areas? If so, these figures do not express "lands developed for recreation pursuits." We feel that the .2 percent figure is very misleading. One of the greatest projected needs will be undeveloped land for dispersed type recreation. You bring this out in other segments of the report (Example: 4/18-22).

How do the figures in C-1 relate to the use data and acreage figures for "developed" recreation? We note that acreage figures (C-1) are not shown for most National Forest campgrounds. The same is true with "1963 Visitation." We will be glad to supply this data.

Page 4-9 - "The private winter sports resorts represent the only source of developed skiing facilities in the Lake Superior Basin." Does this include the Porcupine Mountain ski facilities? We are under the impression that these are State-owned (operated by concession permit).

Page 4-18, la - How does this relate to page 3-5, showing swimming as the most popular water dependent demand?

Section 4 - We feel the report might be better organized to show: (1) The supply and attractions of the basin (Section 4) followed by Demand. Much of Section 4 is a part of Section 2. Section 4 gives a very good "all-around" picture of recreation in the Basin.

Page 4-30 - "Thousands of acres of public land with their fire lands, ----". We are not sure what this means.

Page 4-34 - Change to Sylvania Recreation Area. The Management Plan for this area anticipates that $3 million will be needed for the development of this area for its natural and scenic values.

Page 5-1 - Change Sylvania Wilderness Area. This area is not part of the wilderness system. This also applies to page 8-3, and 9-2.

Page 6-2 - The Ontonagon River and several other streams also have many eroding and slumping large clay banks.

We wonder if there is any longer a need to assume that accumulations of taconite silt are concentrating on the lake bottom (6-13)?

Table 6-1 - Soil also shortens life of reservoirs and lakes, and sediment is also a carrier of certain chemicals, such as phosphate.

Page 7-4 - We consider the cold water of Lake Superior a definite asset. Your discussion on thermal pollution is valid here. Water temperatures, suitable for swimming, would adversely affect the ecology of this lake. Perhaps the report should emphasize that the swimming potential is limited, and development for this use should be concentrated on inland lakes, where suitable, or at artificial pools.

Page 7-13 - In certain areas snowmobiles may have an adverse impact on wildlife. Zoning, or use only on designated trails will be appropriate for these areas.

Page 7-19 - What are the Federal responsibilities under P.L. 90-454?

Section 9-2 - The recommendations are very good. They are backed up by the body of the report, except that Item 3 may indicate a lack of existing cooperation ("---more closely assist---"). We do not think this is the case. If so, it should be defined in the Report.

We feel it is incorrect to use what appears to be the total acreage figure for the camp and picnic sites (B-6 and Appendix C), as measure of percent of the development of the total land and water acreage (A-2). The report should clearly indicate that this is campground development.

Page B-8 - Do the development estimates for fishing take into account that percentage of use not requiring "development?"

Again,we appreciate the chance to review this fine report. It is a positive step in the solving of complex environmental problems. If we may be of further service, please call on us.

Sincerely,

(Signature)
J. H. Cravens
For: GEORGE S. JAMES
Regional Forester

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SUPERIOR NATIONAL FOREST
P.O. Box 338, Duluth, Minnesota 55801

3520

June 24, 1969

Mr. Roman H. Koenings, Regional Director
United States Department of Interior
Bureau of Outdoor Recreation
Lake Central Region
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

We have reviewed the preliminary draft of "Water-Oriented Outdoor Recreation - Lake Superior Basin." Please accept our comments in the constructive spirit in which we give them.

By pages, our comments are as follows:

Page 2-9	Can you name the reservoirs referred to here?
Page 2-19	The Boundary Waters Canoe Area should be described more fully. Its uniqueness should be recognized as an asset to Zone 3 of the Lake Superior Basin.
Page 3-7	In one sentence it is said "recreation activities in the Lake Superior Basin are not expected to increase substantially." Two sentences later it is said that "the participation in certain activities such as snow skiing, pleasure boating, and canoeing may greatly increase."
Page 4-1	A large acreage of county land is located in Zone 3.
Page 4-2	Although we have not taken the time to break down acreage managed by the Federal, State, and county agencies in Zone 3, it is highly likely that the Federal government manages the "greater bulk of lands." A map is enclosed showing the boundaries of the Superior National Forest.
Page 4-3	Your statement to the effect that the amount of recreation development on Federal land is "not great" is misleading. A total of 14 campgrounds, 8 picnic grounds, 10 swimming beaches, and 31 boat launching sites exist currently on the Zone 3 portion of the Superior National Forest. It is long standing Forest Service policy to develop recreational facilities in amounts great enough to accommodate average peak season weekend use. This we have done on the Superior National Forest.

Page 4-9	On page 3-2 and 3-3 there is a statement to the effect that no determination of snowmobile use was made. On page 4-9 you state that snowmobiling surpasses skiing in popularity.
Page 4-21	We think the canoe routes in the Boundary Waters Canoe Area should be mentioned here.
Page 4-25	A survey conducted by the North Central Forest Experiment Station, St. Paul, Minnesota, in 1967 concluded that most people camping on National Forest land do not seek out or prefer facilities such as showers, electrical hook-ups, concession stands, or other similar conveniences. Rather, they prefer privacy and a primitive setting.
Page 4-29	To our knowledge moose are not legally hunted on the United States side of the Lake Superior Basin.
Page 6-1	We feel your statement to the effect that "existing (pollution) problems at first hand seem insignificant" does much to reduce the urgency conservationists in the Lake Superior feel.
Page 6-8	No mention is made of industrial pollution of the St. Louis River originating in Cloquet, Minnesota.
Page 7-3	We are not sure that we agree with your conclusion that reaching a given facility "quickly and easily" will increase demand satisfaction. We are not sure what "demand satisfaction" means.
Page 7-11	We feel it is unwise to conclude that "the short summer season, the limited water contact activity, and the remoteness of the Lake Superior Basin will remain problems in attracting great numbers of tourists to this Basin." It is impossible to know this; therefore, it should not be stated as fact.
Page A-3	Lookout Mountain Ski Area is outside the boundaries of the Lake Superior Basin.
Page A-4	The BWCA should be included in your list of "canoe trails".

A final point occurs to us. Use of such adjectives as "vast" acreages of publicly owned lands (page 4-28), "more than adequate" resource base (page 2-11), "great wealth" of public lands (page 4-35), and "unlimited" supply of readily available land (page 5-1) are reminiscent of early descriptions of resources such as the "vast" white pine stands, long ago exhausted. The land base located within the Lake Superior Basin is fast dwindling.

(Signature)
K. W. UDD
Acting Forest Supervisor

Enclosures

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DEPARTMENT OF THE ARMY
LAKE SURVEY DISTRICT, CORPS OF ENGINEERS
630 Federal Building & U.S. Courthouse
Detroit, Michigan 48226

In Reply Refer To:
NCLDE-C

24 June 1969

Mr. Roman H. Koenings
Regional Director
U.S. Department of the Interior
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan

Dear Mr. Koenings:

We have only minor comments upon your preliminary report "Water-oriented outdoor recreation, Lake Superior Basin" which you sent to us for review on 22 May 1969. We apologize for not meeting your deadline of 16 June, but the report was misplaced by one of our reviewers. Our comments are as follows:

Page ii -- third line -- the coordinated values that have been developed by the Lake Survey and appropriate Canadian agencies are 16,900 and 20,600.

Page 2-1 -- second and third lines -- the coordinated values are those listed above.

Page 2-7 -- paragraph 4, second and third lines -- the coordinated values are 31,700 and 489.

Page 2-7 -- last sentence on the page -- short term fluctuations are caused primarily by wind and barometric disturbances. Seiches are the inertial oscillations of the water surface that follow water level rises induced by these disturbances.

Page 2-8 -- fourth line from bottom of page -- the name of the mining company was "Calumet-Hecla."

Page 2-12 -- table -- note that the total listed for the land area of the Lake Superior basin of 15,468 square miles does not agree with the figures on pages ii and 2-1 that should be 16,900 square miles.

Page 7-19 -- twelfth line from bottom of page -- the fluctuations since 1953 have been 2-1/2 feet and 5 feet.

In our review, we have commented only upon statements of fact. Our lack of comment does not imply agreement with or indorsement of opinions expressed or conclusions drawn in the draft.

Sincerely yours,

(Signature)
JAMES E. BUNCH
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
C REGIONAL OFFICE
O REGION V
P 433 West Van Buren Street, Room 712
Y Chicago, Illinois 60607

Consumer Protection and
Environmental Health Service

September 4, 1969

Refer to: PHS-BWH

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
Lake Central Region
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

We regret that we were unable to complete a review of the report on Water-Oriented Outdoor Recreation, Lake Superior by June 16, 1969. Although these comments are quite tardy, they may still be of use.

Our general impression of this report is that it is well written and fulfills its purposes as outlined in Chapter I. The following comments refer to detail of interest to the Public Health Service.

On page 1-1 the footnote should read "Formerly the Division of Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare.

It is noted that the report includes no elaboration on the subject of the development of sanitary facilities at the various recreation areas except for a brief description of the facilities provided at remote camping sites in the National and State forest lands. Such a discussion is perhaps beyond the scope of this report. Information, however, regarding the degree of development of existing facilities and the condition of existing facilities is important to a meaningful evaluation of needs.

On page 4-19 the statement "Considering its remoteness, the relatively few lakeside residents, and the abbreviated boating season, the current number of recreational craft using Lake Superior waters is probably substantial," is inconsistent. With the factors considered, a conclusion of "quite low" would seem more logical than "substantial." This conclusion is borne out by subsequent discussion in the report.

An apparent anomaly is found on page 5-2. The discussion of present needs includes the statement that recreation facilities in all zones are almost never overcrowded. The present requirements table shows a needed increase in developed recreation acreage of 2300 acres or 40 percent over the existing 5700 acres. This apparently means that the present developed acreage is misplaced or the Lake Superior basin is not receiving its estimated share of the market area demand.

The report's syllabus and Chapter 6 present a well written summary and excellent information on the health aspects of water quality. A table, however, showing a summary of the data, particularly bacteriological, used to determine the location and degree of impairment of recreational waters would be of interest.

The opportunity to present these comments is appreciated.

Sincerely yours,

(Signature)
F. D. Maddox
For: DONALD W. MARSHALL, P.E.
Water Hygiene Representative
Environmental Control Administration

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UNITED STATES GOVERNMENT

MEMORANDUM July 1, 1969

To: Regional Director, BOR, Ann Arbor, Michigan
Attention: Mr. Rieck

From: Water Resources Studies Coordinator, BCF,
Ann Arbor, Michigan

Subject: GLIRBP - BOR draft on Lake Superior segment

We have received your May 22 request for review of your draft report "Water-Oriented Outdoor Recreation - Lake Superior Basin" and apologize for our delay in supplying comments.

1. Page 2-13, paragraph 2, line 1 - Should not "beginning" be "ending."

2. Page 4-2, second full paragraph - Suggest deleting "successful" in the first line and adding a third sentence, "Although the Lake Superior plantings have not experienced the phenomenal success of the Lake Michigan plantings in terms of growth rate, they will add to the diversity and appeal of the fishery resource."

3. Page 7-7, line 1 - Following along the same line as the last comment, deleting "optimistic" would not limit the sense of the statement while avoiding the connotation that we have a replication of the Lake Michigan situation in Lake Superior.

4. Page 7-8, paragraph 1 - While the wording does not exactly say so, some might read the idea into it that the commercial fishery at Grand Marais might prosper again based on salmon. This is very questionable and you might want to re-examine the wording in this light. The word "fishery" might be inserted between "commercial" and "operators" in line 5.

(Signature)
Robert L. Schueler

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UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

June 12, 1969

Memorandum

TO : Regional Director, Lake Central Region, Bureau of Outdoor Recreation, Ann Arbor, Michigan

FROM : Regional Director, Bureau of Sport Fisheries and Wildlife, Minneapolis, Minnesota

SUBJECT: Bureau of Outdoor Recreation Lake Superior Great Lakes-Illinois River Basin Report (re your memorandum of 5/22/69)

The report will serve as a useful reference for use by recreational planners in the Lake Superior Basin. Your staff has done an excellent job of pulling many scattered facts together in the preparation of this report.

We feel the report's readability could be improved with editing to delete extraneous verbage. We refer to no particular area within the report; rather, we offer this comment as a generalized observation.

On page 6-12, paragraph 3, we believe this sentence could be improved. Assuming toxicity of metals, are toxic elements available in a colloidal suspension? Also, in the fifth line of the paragraph the word "migrating" implies cycling or a return to the point of origin. Is this the situation that you are describing?

Thank you for the opportunity to comment.

(Signature)
S. F. Jorgensen

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
GREAT LAKES REGION

33 East Congress Parkway, Room 410
Chicago, Illinois 60605

June 16, 1969

MEMORANDUM

To: Mr. R. H. Koenings, Regional Director
Lake Central Region, Bureau of Outdoor Recreation

From: Regional Director

Subject: Water-Oriented Outdoor Recreation, Lake Superior Basin
(Preliminary, May 1969)

As requested in your memorandum of May 20, 1969, we have reviewed the subject report. The report is very informative and should be useful not only to our agency but also to other agencies of government and to private organizations. Most of our comments involve minor changes in wording or suggestions for deleting or expanding some of the items discussed in the report. Our specific comments are listed below.

1. Page iii, paragraph 2, line 3. Change to read "(1) the pollution of the St.Louis River below Cloquet and in the Duluth-Superior area ...".

2. Page iii, last paragraph. We suggest separating references to Federal and State into individual sentences and mentioning appropriate state laws, of each state. You may wish to include the following statement relative to water quality standards either at this point of the syllabus or later in the report: "Water quality standards have been adopted for Lake Superior by the Lake Superior States and approved by the Department of the Interior. The States assigned their highest use categories to Lake Superior (i.e., public water supply, whole body contact recreation and cold water fishery)."

3. Page 1-1 Purpose. We recommend the more limited wording used in your Lake Michigan Basin report, i.e., deleting the first two sentences and beginning the paragraph with "The purposes of this study are to:".

4. Page 1-3, second paragraph, line 4. Insert after the word "the" and before the word "project" the following words "outdoor recreation aspects of the"; also line 8 - after the word "the" and before "GLIRB" (not GLIRP) insert similar wording.

5. Page 1-4, first line. Change (NPN) to (MPN).

6. Page 1-8. Change Wisconsin Department of Natural Resources, Division of Resource Development to Division of Environmental Protection. Also, change Water Pollution Control Commission to Minnesota Pollution Control Agency and do not list as part of Department of Conservation.

7. Page 2-2, line 16. Should Nemaosi be Nemadji?

8. Page 2-4, paragraph 1, line 1. Is it 28-30 inches of "rainfall" or "precipitation" per year?

9. Page 2-6, Plate 2-4. Legends 1 and 3 seem to be the same.

10. Page 2-8, paragraph 4. Should Hecla-Calumet be Calumet-Hecla?

11. Page 2-15, last sentence. Increase should be 69 percent not 47 percent.

12. Pages 4-32 to 4-38. A map showing proposed, and potential recreation areas would be useful.

13. Page 5-4. There is no Table 5-2.

14. Page 6-1, paragraph 1, line 6. Reword to read "Most existing problems ...".

15. Page 6-2, first full paragrapn. This paragraph is too "sweeping" in character. We suggest abstracting the following material from the report "An Appraisal of Water Pollution in the Lake Superior Basin" (USDI-FWPCA, Great Lakes Region, April 1969): last paragraph, p. 23; first two paragraphs, p. 24; first two paragraphs, p. 25.

16. Page 6-2, second full paragraph. Add Cloquet to list of cities.

17. Page 6-2, second full paragraph. Add suspended matter to list of deleterious substances. Also, say these wastes are entering Lake Superior and tributary waters. Delete the word "bays" and "at these municipal locations" in third sentence of the same paragraph.

18. Page 6-2, last paragraph. Add "Lake Superior and" between "of" and "some".

19. Page 6-7, Table 6-1. Oxygen-consuming substances in "Effects" column, change "Toxic" to "Detrimental". Where are the "previously mentioned human wastes" listed?

20. Page 6-10, paragraph 2. "60,000 long tons".

21. Page 6-12, first sentence. We suggest that this sentence be replaced by the following. "In May 1969 the Lake Superior Enforcement Conference was held to consider this matter as well as other water pollution problems. In connection with this conference the Federal Water Pollution Control Administration, USDI, issued the report "An Appraisal of Water Pollution in the Lake Superior Basin." Efforts are being made to develop a suitable course of action.

22. Page 6-12 (General). We suggest including some of the material of selected paragraphs under III. The Pollution Problem of the above mentioned FWPCA report--also papermills at Cloquet, hydroelectric plants and recreation at Jay Cooke State Park.

23. Page 6-12, last paragraph. We suggest using wording from pages 25 and 48 (item 2) of the above report rather than the wording as now shown.

24. Page 6-14, line 6. BOD (Biochemical Oxygen Demand).

25. Page 6-14, paragraph 2, last two lines. Clarification is needed e.g., 2,000 mg/1--or 2,000 pounds per day. Last sentence probably in error.

26. Page 6-14, last paragraph. We suggest deletion of this paragraph as a more comprehensive study probably is needed before drawing conclusions.

27. Page 6-15, number 4, line 4. Change to read "the effluent from the municipal plant is discharged to the Anna River near its mouth...".

28. Pages 6-14 through 6-17. Have the situations been reconfirmed as being current?

29. Page 6-19, Item F. Does not tie in to Lake Superior as written. Some information is contained on pages 103 and 104 of the FWPCA report mentioned in item 21 above.

30. Page 6-20, Item G. We suggest omitting the second sentence.

31. Pages 6-21, 22, 23, paragraph H. There is perhaps too much emphasis on Michigan and not enough on Minnesota and Wisconsin.

32. Page 6-24, first full paragraph, last sentence. All three States have adopted intrastate water quality standards.

33. Page 6-24, first full paragraph, line 8. Change to read "...and the resolution of certain criteria in the Fisheries and Recreation--Class C category, Minnesota's interstate ...".

34. Page 6-24, second full paragraph, last sentence. Time extensions are occasionally given.

35. Page 6-25, paragraph 2. Needs updating.

36. Page 7-14, 1-b. Include a statement that "Under provisions of the Water Quality Act of 1965, each state in the Lake Superior Basin has adopted water quality standards for its interstate waters." Also we suggest including a statement that research facilities in the Great Lakes Region include a National Water Quality Laboratory at Duluth, Minnesota.

37. Page 7-19, 2-a. Michigan has intrastate standards.

38. Page 7-23, paragraph 3. The $20 million bonding program is "out". We assume comments will be submitted by Minnesota agencies.

39. Page 7-25, paragraph 3. This discussion should be updated.

40. Page 8-3, item 10. Mention should be made of the Lake Superior Enforcement Conference and that all major sources are on waters that have water quality standards.

41. Page 9-2, item 6. Mention should be made of the Lake Superior Enforcement Conference (and see comment 39 above).

42. Page 9-2, item 7, next to last line. After the word "values" reword the remainder of the sentence to say appropriate preventive measures should be taken (deleting the words starting with "then" and ending with "public".

43. Tables A-1 through A-5. The base year for the data should be indicated.

44. Bibliography. Add the report "An Appraisal of Water Pollution in the Lake Superior Basin", U. S. Department of the Interior, FWPCA, Great Lakes Region, April 1969; we suggest deleting item 87 unless it is significant and can be made more specific.

We hope that we have been helpful to you. Let us know if we can be of any further assistance.

(Signature)
H. W. Poston

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UNITED STATES GOVERNMENT

U.S. DEPARTMENT OF THE INTERIOR, FWPCA
National Water Quality Laboratory
6201 Congdon Boulevard
Duluth, Minnesota 55804

MEMORANDUM

June 4, 1969

TO : Roman H. Koenings, Regional Director
Lake Central Region
Bureau of Outdoor Recreation

FROM : Mr. Charles Walbridge
Research Aquatic Biologist

SUBJECT: Lake Superior Report

This report might be a little clearer if the three zones were referred to consistently by descriptive names rather than by numbers, or at least the numbers should be consistently Roman or all Arabic.

That is it, other than some minor typographical errors, which are marked in this copy.

(Signature)
Charles T. Walbridge
Research Aquatic Biologist

Enclosure:
Lake Superior Report (1 cy)

UNITED STATES
C DEPARTMENT OF THE INTERIOR
O NATIONAL PARK SERVICE
P MIDWEST REGION
Y 1709 Jackson Street
Omaha, Nebraska 68102

In Reply Refer To:
L7423 MWR CFA June 3, 1969

Memorandum

To: Regional Director, Bureau of Outdoor Recreation, Lake Central Region, 3853 Research Park Drive, Ann Arbor, Michigan 48104

From: Assistant to the Regional Director, Cooperative Activities and Public Affairs

Subject: Lake Superior Report

We appreciated the opportunity of reviewing the subject well written and comprehensive report. We have no comments.

We shall retain the two draft copies in our files until we receive the final report at which time we will dispose of them unless otherwise advised.

(Signature)
Bill W. Dean
Assistant to the Regional Director
Cooperative Activities and Public Affairs

COPY

STATE OF MICHIGAN
SEAL
WILLIAM G. MILLIKEN, GOVERNOR
DEPARTMENT OF NATURAL RESOURCES
Stevens T. Mason Building, Lansing, Michigan 48926
Ralph A. Mac Mullan, Director

July 11, 1969

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan 48104

Re: D6427GL

Dear Mr. Koenings:

The preliminary draft of your report, "Water-Oriented Outdoor Recreation - Lake Superior Basin," has been received.

It is our understanding this report was requested by the Federal Water Pollution Control Administration in connection with their comprehensive study of water quality in the Superior Basin, and that it represents the last in a series of such reports on the Great Lakes Basin.

We wish to limit our comments to a few general observations. The Michigan portion of Lake Superior Basin has been experiencing significant changes. Declining industrial activities and the State's active antipollution program require updating of your report to 1969 conditions. Certain references, largely in Chapter 6, are no longer valid. We would also like to have the name of our agency updated to the Department of Natural Resources on page 1-8 and on several other pages. At this date, it would also be possible to update the section discussing the Michigan bonding program.

We concur with the more specific comments presented June 16, 1969, by the Water Resources Commission regarding water quality.

The concept discussed regarding additional attention to scenic easements to protect valuable land and water resources from incompatible developments is well taken. Such easements, together with assessment policies, could help preserve recreational qualities and enhance scenic values of the presently relatively undeveloped portion of the Superior Basin. This is, of course, in addition to outright acquisition of essential shoreline areas and other key tracts.

We do not disagree with the conclusions or recommendations as presented.

Thank you for the opportunity to review this preliminary draft.

Sincerely yours,

(Signature)
Ralph A. MacMullan
Director

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STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Stevens T. Mason Building, Lansing, Michigan 48926

June 16, 1969

Mr. Roman H. Koenings
Regional Director
U.S. Department of the Interior
Bureau of Outdoor Recreation
Lake Central Region
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

In reply to your request for the review of your preliminary publication entitled "Water-Oriented Outdoor Recreation, Lake Superior Basin," we offer the following comments on the report.

Page iii: The report states that "In general, the Lake Superior Basin has waters of excellent quality." We concur in this statement and feel that this point should be emphasized throughout the report. With the sparse, non-expanding population, and the decline in industrial activity, and this Commission's very active anti-pollution program, it seems doubtful that the high quality of the Basin's waters is in any jeopardy.

Page 6-2 of the report states that "Concentrations of industrial wastes are found in the cities of Duluth-Superior, Ashland, Wisconsin, Sault Ste. Marie, Munising, Houghton-Hancock, and Marquette, Michigan." There are no industries discharging wastes into the St. Marys River at Sault Ste. Marie, Michigan. Existing industrial discharges are in "Soo", Canada. This Commission has reported to the International Joint Commission on the nature of the problem from these sources.

Page 6-15, Munising, Michigan: The report states that, "The municipal plant discharges from the mouth of the Anna River, causing the stream to take on a milky appearance from that point to its mouth."

The Munising treatment plant discharges to the Anna River some distance upstream from its mouth. It is our opinion that the effluent from this plant alters the appearance of the river for only a few hundred feet and does not cause the stream to take on a milky appearance from the point of discharge to its mouth.

Page 6-15, Munising, Michigan: The report states that organic dyes discharged from the Kimberly Clark Paper Plant on Munising Bay discolor the water and that phenols impart "tastes" to the water.

To our knowledge, there is no phenol problem at this plant.

The dyes used in the paper plant are inorganic dyes which are used generally only three to seven days each month. The Company has been continuously working on means to overcome the objectionable effluent color which results from the use of such dyes.

Page 6-15, Marquette, Michigan: The report states that soot-like particles, originating from a nearby chemical plant, cause disagreeable odors in the air and impart objectionable tastes to the surrounding waters.

The chemical plant in question has recently announced the termination of all activities.

Page 6-16, Houghton-Hancock: The report states that Torch Lake receives industrial effluents and raw sewage discharges and is highly polluted. Certain sectors of the lake receive raw sewage discharges; however, we feel the effect on the total water quality of Torch Lake is negligible. The communities involved have engaged engineering consultants to prepare plans for treatment facilities.

We appreciate the opportunity to review this report and offer our comments. If you would like further discussion, please let me know.

Sincerely,

WATER RESOURCES COMMISSION

(Signature)
Norman Billings
Assistant Executive Secretary

cc: Ralph Mac Mullan
Herbert Miller

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STATE OF MINNESOTA
DEPARTMENT OF CONSERVATION
ST. PAUL, MINNESOTA 55101

June 6, 1969

Mr. Roman J. Koenings
Regional Director
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

I have reviewed the preliminary draft of your report "Water-oriented Outdoor Recreation Lake Superior Basin" sent to us. Our review was made primarily from the standpoint of outdoor recreation in the basin as relating to the State of Minnesota.

We found the report was generally factual and quite complete in coverage. As in the case of most reports of this nature there are certain elements of the methodology which I find in disagreement with our own findings as related to demand studies.

With regard to the methodology it seems that the studies carried out by California and O.R.R.R.C. Report #4 are often used for reference where 60% of the activity was found to occur within 40 miles or about 1 hour travel time from the participants home, another 30% between 40 and 100 miles and an additional 10% at distances greater than 125 miles. Our study seemed to show that in a tourist-oriented area, which I believe the Lake Superior Basin could be; it appears that a considerable higher portion of people come from distances greater than 125 miles. In fact our demand study finds that 40% of the public recreating on weekends are willing to travel at least 3 hours or approximately 125 miles from the Twin Cities area.

I realize it is too late in the process of developing this study to change such methodology but feel that perhaps some additional consideration should be made of this in future studies involving the northern portion of Minnesota.

Some of the minor comments that I would like to make are as follows:

1. Page ii, 1st paragraph, the statement large section of Minnesota's North Shore area should probably read all of Minnesota's North Shore area.

2. Page iii, since the 1969 Legislature passed a shoreland management program for Minnesota this might be mentioned along with that of Wisconsin and Michigan's in the last paragraph on this page. This would change recommendation No. 4 on Page 9-1. On the same page I am wondering if the statement contained in the second sentence of the second paragraph should not be modified to read "suspected pollution problem since the taconite

discharge has not been proven to be a pollution problem yet and will require additional evidence before the FWPCA makes their decision on it.

3. Page 1-8, the Minnesota Water Pollution Control Agency is now called the Pollution Control Agency. It is a separate agency and is not a part of the Department of Conservation. Incidently, the Department of Conservation has had its name changed by the 1969 Legislature to read Minnesota Department of Natural Resources.

4. Page 2-11, since there are two Grand Marais's in the basin would it not be more clear if the word Michigan followed in parenthesis.

5. On page 2-18, considerable elements between income and outdoor recreation is inferred in the item under 4. Leisure Time. We have found that certain types of outdoor recreation primarily fishing and hunting do not seem to be related to lower amount of income insofar as the residents of the northeastern portion of Minnesota is concerned. Whether or not this is true in other places I do not know but the availability of opportunities appears to be overriding the influence of lower income.

6. Page 4-20, the reference to power boating would infer lakes and reservoirs near Duluth receive considerable boating. Although this is generally true because of the proximity of Duluth power boating now has increased considerably in the other lakes in the basin particularly those on which resorts are concentrated along the Gunflint Trail in Cook County. It is also notable that the lakes of harbors of refuge along Minnesota's North Shore is probably one of the chief deterrents to boating along the North Shore by even the larger water craft.

7. On page 4-25, it might be worth noting that Gooseberry State Park on the North Shore of Lake Superior has the heaviest campground use of all Minnesota's state parks with regard to intensely of use per site. This is no doubt due to the high number of the travelling public following the Great Circle Route.

8. Page 4-30, since you have mentioned the establishment of snowmobile trails in Wisconsin it might be worthwhile to note that Minnesota inventoried 3,147 miles in the state in 1967 and that this has probably grown to over 4,000 miles by this time.

9. In Chapter 8, Conclusions, it is assumed that the deficit of 2,300 acres does not include private recreation developments cross-country nor trails or other dispersed recreation lands.

10. On page 7-24, line 1, legislation was enacted to establish a system of recreational boating rivers providing for marking and entering into cooperative developments.

I hope that the comments, where applicable, will be of some help to you in completing this excellent report.

Very truly yours,

(Signature)
Jerome H. Kuehn
Planning Administrator
Bureau of Planning

C STATE OF OHIO
O DEPARTMENT OF NATURAL RESOURCES
P Ohio Departments Building
Y Columbus 43215

June 12, 1969

Mr. Roman H. Koenings, Regional Director
U.S. Department of the Interior
Bureau of Outdoor Recreation
Lake Central Region
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

Our staff has carefully reviewed the preliminary draft of Water-Oriented Outdoor Recreation - Lake Superior Basin and feel that it provides information useful to all states in the Great Lakes Basin. We would appreciate a copy of the final report for our library.

Sincerely,

(Signature)
FRED E. MORR
Director

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STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
Box 450, Madison, Wisconsin 53701

June 16, 1969

Mr. Roman H. Koenings, Regional Director
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

The report, "Water-Oriented Outdoor Recreation - Lake Superior Basin," has been reviewed by our staff. We have one general comment and numerous specific ones, some of which reinforce our general comment.

There seems to be an over-all attempt to indicate that there is something wrong with having a large area of relatively undeveloped recreation resources. Concomitantly, there appears to be an effort to show that there is or will be a big "need" to be met by development of the area, whereas the facts contained in the report don't really support this. The problem of deciding between development of facilities close to population centers versus development far away but where resource opportunities are readily available is not easily resolved; it appears to have been largely ignored in this report.

Specific comments by page (we have omitted typographical mistakes completely):

2-18 1st paragraph. No one who has lived in northern Wisconsin would agree that "This indicates that lower-than-average amounts of leisure time are probably devoted to outdoor recreation." Because the opportunity is right there, and costs for many activities are nominal, the underpaid northern resident probably spends more time in pursuant of outdoor recreation.

2-20. You can't spend a vacation in an airplane, and it is the entire basin and its resources rather than a single attraction like Grand Canyon, that is the attraction. We doubt that more major airports would do much to increase tourist and vacationist numbers.

2-26. Items a, b, and c under "2. Plan for year-around tourism" hardly seems to assure a year-long season. Being realistic, there isn't any way to do this - seasons can be extended, but late winter and spring (on the calendar only, in this area) will never amount to much.

4-9. Lines 8-9 all jumbled up.

4-15. Line 6. Apostle Islands are primarily rock formations, not sand and forest.

4-16. Last paragraph. Canadian-bound fishermen are probably the largest traffic generator in spring and summer on U.S. Hwy. 61.

4-27. 1st paragraph. Many Wisconsin counties designate, mark and publicize colorama tours, including some of those in the Basin.

4-30. Last sentence. As written, the sentence infers that the State did this. This is incorrect - it was counties or private groups.

4-31. Below photo 43. We fail to see how factors 1 and 2 have any more inhibiting influence on the Basin than on some other skiing area.

Last sentence - Where is there any indication of this? Most northern lakes too snow covered to be good ice boating.

4-37. A "dominance of small ownerships" discouraging large investments is unlikely. This would seem to invite them - less competition.

5-2. Lines 9-13. These two sentences are poorly written and hard to understand.

The last two sentences are contradictory. If existing facilities are never overcrowded, who needs more?

5-5. What happened to 2000 and 2020 figures in Table 5-3.

6-12. 1st sentence. If the survey was properly done by competent people, the findings should be considered legitimate and hardly should require the "approval" of USDI.

7-11. 4th paragraph. Once again - why must we attract "great numbers of tourists to this basin?" "Bigger is better" is apparently a common disease of planners.

7-25. 1st paragraph. Why have the Brule River State Forest and the Apostle Islands State Forest been ignored? The Brule River Forest (almost 29,000 acres) certainly protects an important recreation resource. Also, state ownership on Stockton and Basswood Islands is important, as is the state park being developed at Big Bay in Madeline Island.

7-26. Might not a reference, added to line 7, to Wisconsin Statutes, Chapter 31.30, prohibiting dams on the Brule be appropriate?

7-27. Line 3, Division of Resource Development has now been changed to Division of Environmental Protection.

8-4. End of "b." If this is a chapter on conclusions, what did the "investigation of the taconite deposition" show. The reader is left without a conclusion.

9-1. Item 2. Which responsible public agencies? Suggested assignment of responsibilities might be useful.

9-3. Several other recommendations should, we believe, be made:
  a. Acquire as much Lake Superior shoreline as possible.

  b. Accelerate North County trail project.

We appreciate the opportunity to review this report.

Very truly yours,

(Signature)
John A. Beale
Deputy Secretary

GPO 819-792